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**WORLD GEOGRAPHY AND
WORLD PROBLEMS**

The "Citizen of the World" Geographies

In four volumes, with Maps, etc.

By J. F. UNSTEAD, M.A., D.Sc.

- I. THE BRITISH ISLES OF TO-DAY
- II. EUROPE OF TO-DAY
- III. WORLD GEOGRAPHY AND WORLD PROBLEMS
- IV. THE BRITISH EMPIRE AND ITS PROBLEMS

Volume IV in preparation

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THE "CITIZEN OF THE WORLD" GEOGRAPHIES

WORLD GEOGRAPHY AND WORLD PROBLEMS

BY

J. F. UNSTEAD, M.A., D.Sc.

PROFESSOR OF GEOGRAPHY IN THE
UNIVERSITY OF LONDON

AUTHOR OF "PRACTICAL GEOGRAPHY"
JOINT AUTHOR OF "GENERAL AND REGIONAL GEOGRAPHY"
AND "ESSENTIALS OF WORLD GEOGRAPHY"

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“Let travellers cross seas and deserts merely to measure the height of a mountain, to describe the cataract of a river, . . . but what advantage can accrue to a philosopher from such accounts, who is desirous of understanding the human heart, who seeks to know the *men* of every country, who desires to discover those differences which result from climate, religion, education, prejudice, and partiality ? . . .

“Confucius observes that it is the duty of the learned to unite society more closely, and to persuade men to become citizens of the world.”—OLIVER GOLDSMITH : *The Citizen of the World* (176c).

PREFACE

THIS book is the third in a series which endeavours to provide a complete and systematic course in geography reaching "Matriculation standard," and particularly suitable for secondary schools.

The course has been planned in the belief that the teaching of geography should be interesting and based upon descriptions, and that its chief aims are to show the relations between man and his environment, and to train young people to be intelligent citizens.

Therefore, this book deals both with physical and with human geography in as interesting and descriptive a way as possible. Further, the physical geography is taught by a scientific method, for the relations between the facts are explained. The regional method is adopted throughout: the continents have each been divided into natural regions which have marked characteristics, and are capable of separate treatment; each region is studied in turn, the natural conditions and the manner of life of the inhabitants being described and related to each other.

The physical geography is therefore taught in connection with those regions which afford good examples of particular phenomena, and not in separate chapters. The only exception is that of the climate of the world as a whole. This is dealt with in Part II of the book, where the Earth is considered as a globe, and an explanation is given of the causes of the facts already introduced in connection with the various continents. In a similar way, the natural regions of the continents are compared

and contrasted in Part II, and the distribution over the world of the main types of natural regions is examined.

As regards the human geography, the writer is in complete agreement with the educationalists who hold that a citizen should have been so educated as to possess a broad knowledge of the various peoples of the world and their problems, together with an attitude of mind characterised both by goodwill to the peoples and a desire to find a just solution to the problems with which his state may be concerned. Hence a guiding principle in the writing of these books has been to help the readers to a *sympathetic understanding* of the lives of the peoples of our own and other countries.

In Part I of this book, the peoples and their ways of life are described in connection with their physical environments in each continent. In Part II the chief facts of the human geography are brought together, and a broad view is obtained of conditions over the whole world. The great problems which now confront mankind, in so far as they have a geographical significance, are examined simply and scientifically, their causes being explained by reference to physical and historical conditions.

The British Isles, Europe, and the British Empire beyond the seas form the subject-matter of the other volumes of this series. They are therefore treated broadly and only from two points of view: one is that they comprise certain natural regions which are described and collated with other natural regions of similar types; the other point of view is that these areas have political and economic relations with the rest of the world, and these relations are considered in the second part of this book.

May, 1923.

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The maps and diagrams are not intended to supersede, but only to supplement, an atlas ; **it is assumed that an atlas will be constantly used**, and this should show, in addition to the political divisions, railways, etc., the elevation of the land by shades of colour, and also climatic conditions and natural vegetation.

WORLD GEOGRAPHY AND WORLD PROBLEMS

PART I

THE CONTINENTS AND THEIR PEOPLES

AFRICA

ALTHOUGH one of the oldest civilisations grew up in Egypt, and northern Africa has been in touch with Europe since the beginning of history, yet the greater part of the continent was practically unknown to Europeans until the latter part of the last century. The great Sahara cut off travel by land, and explorers were faced by many difficulties in entering the continent by means of the Atlantic Ocean. The trade winds blow steadily from the north-east in the latitudes of the Sahara and although these winds would take the sailing ships southward, they would greatly hinder a return journey northward along the African coast ; consequently sailors seldom ventured upon such a voyage.

When navigators had overcome this difficulty, and even in the days of steam ships, the coasts of the central parts of Africa offered other barriers. Good harbours are few, there is often a heavy surf which prevents landing, and the low shores are for the most part swampy and infested with insects carrying malaria and other diseases ; in other parts the shores are barren and the country

behind gives little food or fresh water. Not until the southern extremity of the continent is reached do sailors find an easy landing and a habitable country.

Further, the greater part of Africa south of the Sahara has a plateau form, and the rivers, which form the natural and easiest routes into an unknown region, have rapids where they leave the plateaus for the coastal lowlands. Thus all the great rivers are unnavigable after a certain distance, and it is noteworthy that Stanley, the great explorer of the Congo, first came *down* the valley when on a journey from eastern Africa towards the Atlantic coast, and that this was done only just before the last quarter of last century.

The first Europeans to explore the African coasts were the Portuguese ; they rounded the Cape of Good Hope in 1488, and their early trading settlements led to the acquisition of the large Portuguese territories on both sides of the continent. Asiatic peoples, however, had long before penetrated Africa from the east, both by land and by sea. In a later section it will be explained how the Arabs conquered much of North Africa, partly with the aim of converting the people to the Mohammedan religion. They also worked their way southward along the eastern shores and penetrated into the interior to a considerable extent, more particularly as traders and as slave-raiders.

The greatest changes followed the recent opening-up of Africa by European explorers, missionaries, and traders. In the space of about a quarter of a century the great bulk of the continent was divided among a few European powers, and in the regions where the climate permits Europeans to settle, they are now carrying out such developments that even the appearance of those parts of Africa is being changed and the native peoples are being forced into entirely new ways of life.

The Atlas Lands.—The extreme north-west of Africa (see the map in Fig. 1, p. 11) is in some ways like the south-west of Europe. Only the narrow and shallow strait of Gibraltar separates the curved line of highlands of southern Spain from a similarly curved line of highlands, called the Rif, in Morocco.* The Rif joins on to a greater highland mass known as the Atlas Mountains, which stretches from the Atlantic coast of Morocco through Algeria and Tunis, where the heights become less and the ground sinks beneath the shallow sea between Tunis and Sicily. They rise again in the mountains of that island and are continued in the Apennines of Italy. Thus in their structure the Atlas Highlands are linked with those of Europe. Their highest portion is in Morocco, where they are known as the Great Atlas and rise above the level of the chestnut and oak forests (which recall those of Spain) into high pastures of the "Alpine" type and even reach the level of perpetual snow.

Further east the mountains are lower and widen out so that there are two main ranges which enclose a plateau. The southern range is the Sahara Atlas, relatively bare, overlooking the Sahara Desert; the northern range is the Maritime Atlas, with a fair rainfall and clad with forests. The enclosed upland is called the Plateau of the Shotts, or salt lakes. The lakes lie in hollows which receive water from the surrounding heights, but the climate is so dry that the water is evaporated as quickly as it is received. Therefore it does not collect in sufficient

* All the regions and places mentioned should be looked out in the atlas; the study of maps should go on together with the study of the text. It is very useful to look carefully at the map of each district and at the same time to think of its characteristics as described in the book; this helps one to remember the facts, to associate them with particular localities, and to see how the situation affects the characteristics.

amount to fill up the hollows, to overflow as a river and so to drain into the sea ; the region is therefore one of inland drainage. As the water which enters the lakes contains a small amount of salts dissolved from the ground over which it has flowed, while pure water is evaporated, the salts very gradually accumulate and the lakes become first brackish and at last quite salt. Hence all basin-like areas in a dry climate, where evaporation removes more water than is collected in the basin, become regions of inland drainage with salt lakes ; in some very arid regions the lakes may dry up entirely leaving only the deposits of salt which form a " salt desert."

The Plateau of the Shotts is not, however, a desert ; it is a scrub-land, that is, a poor pasture land with scattered clumps of bushes. Over the plateau herds of sheep and goats wander, moving from place to place as the pasture is exhausted ; the Arabs who own them keep also camels and horses and live in tents made of sticks and a cloth woven from camels' hair. Of late years there has been a great increase in the growing of alfa-grass, which can live on the scanty rains of the region ; this alfa-grass is sent abroad for paper making.

The coastal region is known as the Tell ; this resembles south-eastern Spain, for the climate is of the " Mediterranean " type with a hot, dry summer and a mild, wet winter. The winter rains are caused by the cyclones of the westerly winds which blow over the Mediterranean area at this season. The air in the front of the travelling cyclones is drawn in from the desert ; it comes from the Sahara and is hot and dust-laden. This wind is known as the Sirocco, and is a very unwelcome feature of the winter season. The change of temperature during the year, and the amount and season of the rainfall, are somewhat similar to those at Gibraltar, shown by the graphs in Fig. 5, on p. 67. The temperatures and

rainfall of this region should be compared with those of London, shown on the same graphs by dotted lines.

The natural vegetation, like the climate, is of the "Mediterranean" type; it consists of thickets of ever-green shrubs, such as laurels and myrtles, with larger trees, for example, pines, cedars, and cork-oaks, on the better-watered mountain sides. The streams from the mountains are used to water the hillside terraces and the coastal plains, where wheat and barley are grown, the vine is cultivated, and fruits such as olives, figs, oranges, citrons, and almonds are obtained and exported.

Most numerous among the inhabitants of the Atlas Lands are the people known as Berbers. These belong to the Hamites, a branch of the "Mediterranean" race, to which also most of the inhabitants of Southern Europe belong; the Hamites are therefore classed with the white peoples of Europe. Yet they have a darker skin and frizzy hair; possibly these characteristics are due to a mingling of negro blood, for there has been much contact between the ancestors of the Hamites and the negro peoples with black skin and woolly hair who live south of the Sahara. The great desert has not entirely prevented the mixing of the white peoples north of it and the black peoples on the south. The Berbers are sedentary people, that is, they live in settled or permanent homes, and get their living by agriculture or in other occupations such as wood or metal working, and pottery making, or as labourers and porters in the larger towns.

In the Atlas Lands there are also Arabs who are largely nomadic, that is, they live in tents and wander from place to place on the Plateau of the Shotts or among the mountains, pasturing their herds of sheep and goats, their horses and camels. These people have a lighter skin and finer features than the Berbers; they belong to the Semitic branch of the Mediterranean race. Their

ancestors came from Arabia, in the seventh century, as Mohammedan invaders. They were followers of the prophet Mohammed, who lived first at Mecca and then at Medina on the border of the Arabian desert. He declared that he had visions in which he was commanded to make known a true religion, and to turn his fellow-men from the worship of idols and from evil living. With much difficulty he obtained disciples and became the ruler and law-giver of his people, and after his death his teachings were collected in the Koran, the "Heavenly Book" of the Mohammedans.

The Arabian tribes became fanatical Mohammedans, and forced upon other peoples their creed: "There is no God save Allah, and Mohammed is his Prophet." They made war upon neighbouring peoples and by the power of the sword carried their religion into the adjoining parts of Asia, Europe, and Africa. Arabia is a poor land, and the invaders therefrom made their homes in some of the more favoured regions of North Africa, where many of their descendants still live by pastoral work in the same way as did their ancestors in Arabia.

After this invasion of North Africa the Berber and Arab peoples of the region, known as Moors, extended their conquest across the Mediterranean Sea into Spain, taking with them the knowledge of irrigation gained in Egypt and other parts of North Africa. When they were driven out, centuries later, they left in Southern Spain numerous traces of their occupation, such as the great and beautiful places of worship called mosques. Many Jews were also expelled from Spain when the Christians regained power, and their descendants live as traders in the Atlas Lands, largely in the coastal towns.

Thus, a thousand years ago, the people of North Africa were more powerful than those across the Mediterranean; they imposed their rule upon Spain and increased the

civilisation of that country by improving its agriculture and in other ways. Now the reverse is the case. Northern Africa has not kept pace with Europe in development, and the Europeans have assumed power in the Atlas Lands and are imposing their ways of life upon the region. In the nineteenth century the French conquered Algeria, and much land in the coastal region was taken from the native owners and given to French settlers. Italians settled further east, nearer Italy, and Spaniards further west, nearer Spain.

Although there is a Sultan who is the nominal ruler of Morocco, the Spanish control the Rif Region, while the French have established a "Protectorate" over the rest of that country, and the Sultan has to rule according to the advice of a French official called the Resident-General.

Algeria has become entirely French in its government, so that it is a French colony, and those of the natives who fulfil certain conditions as to age, education, and standing are French citizens. Natives are no longer turned out of their lands, and the government aids them by education and in other ways. Tunis has a government rather like that of French Morocco, with a nominal native ruler under the direction of a French Resident-General.

The French have greatly developed the resources of the region in recent years, particularly in Algeria. The marshes of the coastal lowlands have been drained and thus the ravages of malaria have been checked; the health of the natives has improved and even European settlers can live there without difficulty. There are now in Algeria about a million European colonists (mainly French) beside the four million natives. In Tunis there are half as many natives, but relatively few Europeans; the greater part of these settlers are from Italy, the nearest country to Tunis. Morocco has about as many people as Algeria

and Tunis together, but not more than one in a hundred of them are Europeans. In Algeria and Tunis many of the French colonists have farms and fruit plantations, and agriculture in the coastal regions has become much more productive, while the country could scarcely support its inhabitants before the European occupation. The agricultural Berbers are now better off and have benefited by the French occupation in many ways, but the nomadic Arabs of the Plateau have had their grazing lands taken over for the growing of alfa-grass, and their wanderings have been limited. This has caused trouble between them and the French, and the difference of religion between the two peoples has added to the difficulty. Now, however, the Arabs, willingly or unwillingly, have adapted their manner of life to the new conditions in Algeria and Tunis, yet in Morocco the tribes of the mountainous regions are still hostile to the European government.

Except in the coastal regions and in the mountains of Morocco, there is a lack of water, and one of the benefits brought by the French is the sinking of wells. This has been particularly useful in the country just south of the Sahara Atlas, on the edge of the desert. Here wells have been bored and the ancient oases have been better supplied with water, so that more date palms have been planted and the yield of dates thereby greatly increased ; also new oases have been formed by the sinking of wells, and parts of the desert have thus been reclaimed for the use of man.

To enable the products of the country to be interchanged and exported (largely to France), a system of railways has been constructed. A line has been made throughout the Tell region from Tunis, the capital and chief port of the country of the same name, westward through Algeria just behind the coast. From the main line short branches lead northward to the ports, *e.g.* Bona, Algiers the chief town, and Oran. Longer branches

cross the Plateau of the Shotts and the Sahara Atlas to reach the oases, such as Biskra, on the northern edge of the great desert.

The main railway line continues in Morocco between the Rif and the Great Atlas, passing through Fez to Casablanca on the Atlantic coastal plain, whence it goes inland to the town of Morocco, which is situated on the slopes of the western part of the mountains.

From the rail-heads at the desert oases, traffic to and from the south is continued by caravans; thus the Mediterranean countries are linked to the Sahara and even to the Western Sudan across Algeria and Tunis.

The Sahara Region.—The Sahara is desert, because there is very seldom any rain. The region lies “in the heart of the trade winds,” which blow steadily from the north-east, become warmer as they get nearer the equator, and are therefore dry. They dry up any water over which they blow rather than add to the supply. The air is also very hot, except at night, and the winds are frequently scorching blasts. They are especially trying to men and animals when they form whirls which raise the sand to great heights, and thus produce clouds of sand and dust which obscure the sun and make the air almost impossible to breathe; such dust storms are called Simoons or Simooms.

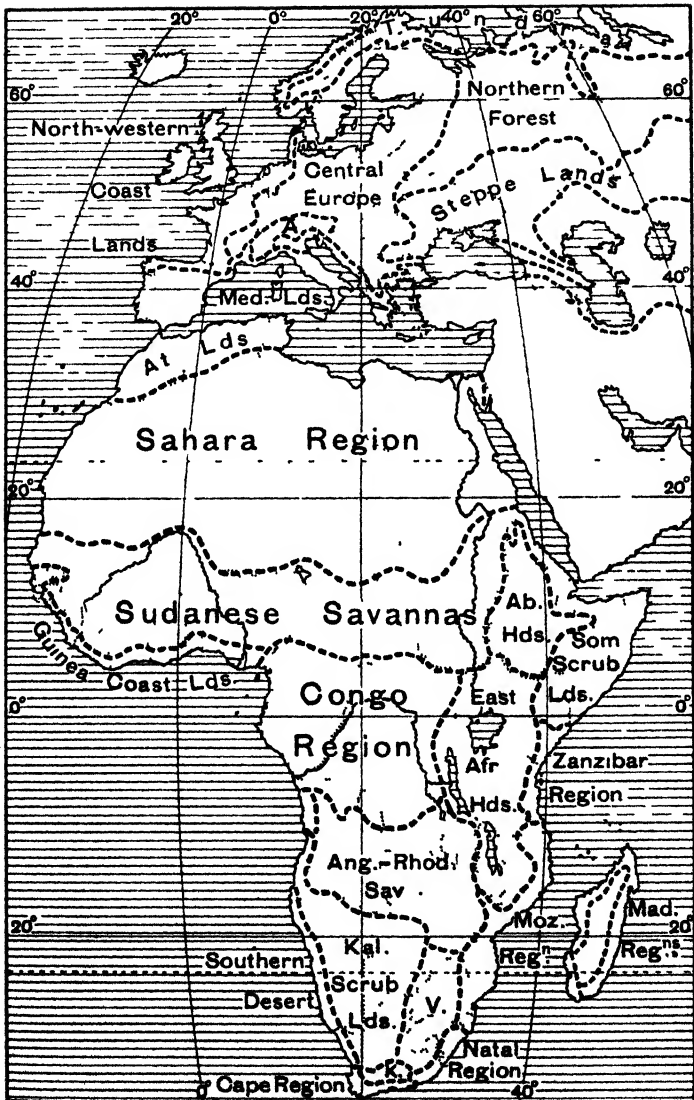
The heat is much greater than that experienced in any part of Europe. The isotherm map in an atlas shows that the winter temperature of most of the region is over 60° F., and therefore at least as high as that of the summer in Britain, while the summer temperature is not far from 90° F., that is, as high as that of any part of the world. While the average temperature is high, there is a marked difference between day and night. The clear sky, which is characteristic of the region, free from clouds and

water-vapour, allows the rays of the sun to pass unhindered and hence the days are very hot indeed, the thermometer often going above 100° and sometimes above 120° . But at night the clear sky has the opposite effect; the heat of the earth is radiated out into space unhindered, and the temperature falls rapidly, even to below freezing-point.*

The great heating and sudden cooling cause the rock surfaces first to expand and then to contract; consequently they crack, and small pieces are broken off. The pieces are blown about by the wind, worn smaller and smaller, and reduced to the state of sand and dust. The sand blows down from the higher parts, leaving in those areas fresh rock surfaces to be broken up; such rocky and stony wastes are known as Hammadas. The lower areas become covered with the sand and are called Ergs; here the sand is blown by the wind into great lines of dunes, usually some 50 feet high, and occasionally even ten times this size. Unless the roots or underground stems of plants bind the sand together and so form the "dead" dunes, the winds blow the particles up one side of the dune and down the other, and consequently the dune as a whole slowly moves its position and is driven before the wind; moving or "live" dunes have in this way overwhelmed and destroyed oasis settlements. Thus there are two main types of Saharan country: the rocky Hammadas and the dune-covered Ergs.

Apart from the hills of sand the Sahara region is by no means a level plain, for in the centre are several high plateaus, and the Tibesti Mountains have one peak which is 11,000 feet high. On these plateaus and mountains there is rain every year, largely in the form of

* The marked difference between day and night which we in England notice in clear anti-cyclonic weather, is due to the same cause, but the contrast in England is not nearly so great.



Emery Walker Ltd. sc.

FIG. 1.—Natural Regions of Europe and Africa

sudden and violent thunderstorms. The water then rushes down the valleys, but soon disappears either by evaporation into the hot, dry air, or by sinking into the stream-beds. These valleys and others in which there are no streams are known as wadis. Most probably there was much more rainfall in the region in past times than there is to-day, for the surface of the land is cut up by many wadis in which usually no water is to be seen. In a number of cases underground water works its way slowly from the highlands across the desert, hidden beneath the old river-beds.

Some of this water rises to the surface in minute amounts, and keeps it moist enough for the growth of a very scanty vegetation. There is, for example, a shrub called *retem*, with a woody stem ; its leaves are reduced to spines, through which little moisture is passed into the air, and it has long roots which enable it to search through the sand to obtain as much water as possible. Another plant is *drin*, a hard, grass-like plant growing in tufts. On such plants feed small burrowing animals, as well as the camels which may have to live on such poor and scanty fare when traversing the Sahara. Insects abound, and on them feed lizards and other reptiles.

There is little life, however, in the really desert areas ; most of it is concentrated in and around the oases, situated where water can be obtained by wells from underground supplies in the valleys. With the water the inhabitants irrigate the date palms, their chief source of livelihood, and also other fruit trees, water-melons or onions. In some areas the water works up slowly towards the surface and allows a rather better growth of the *drin*, *retem*, and grass, forming pasture for sheep, goats, and camels.

The margins of the Sahara have rather more rain, and the growth of grass and bushes may be sufficient to give a

living to pastoral tribes who take their animals from place to place as they exhaust the supply of food. Along the Mediterranean coast between the Atlas Lands and the Delta of the Nile, the growth of vegetation is a little better still, and the region is to be described as a "scrub-land" and may be considered as a poor specimen of the Mediterranean type. In places, as around Tripoli and in the projecting Barka district, the olive tree grows, and a scanty population obtains a living by agriculture.

On the edge of the desert between Tripoli and the Atlas Lands of Tunis and Algeria there is a depression below sea-level, and in this hollow there are "Shotts" formed in the same way as those of the neighbouring plateau. On the southern margin of the Sahara, the desert gradually changes through another semi-desert or scrub-land district to the great grassland of the Sudan.

The people of the Sahara region belong to Berber or Arab tribes, and obtain their living in three ways. Some of them are nomadic herdsmen, dwelling in tents and dependent upon camels for transporting their few possessions. Others are skilled and industrious agriculturalists, living in stone or mud-built houses at the oasis settlements. A third group is engaged in transporting commodities across the desert on their camels, passing from oasis to oasis to get supplies of food and water. Frequently while the men travel with the caravans, their wives carry on agriculture at the home-place in the oasis or on the margin of the desert.

The French have extended their rule from the Atlas Lands southward across the central and western parts of the Sahara so as to link up the northern possessions with those which lie along the coasts of "West Africa" from Senegal south-eastward to the equator. Yet although on a political map showing the French possessions, the northern and southern areas seem to be united, there is

in fact little communication across the Sahara, and the " West coast " districts are reached from the sea. After the Great War an attempt was made to open up a route across the desert by air, but before this could be done depôts of petrol had to be formed along the route. Motor lorries stuck in the sand, and most of the work had to be done by the camel transport commandeered from the natives. Fifteen hundred camels died in this work, and their owners, brought to the brink of ruin, revolted and fled into the desert with the remaining animals. After this, a special type of motor was employed with " caterpillar " wheels, which had been first designed to pass over snow in Russia ; these cars have to carry much petrol, supplies of food and water, and machine guns to protect the travellers against hostile or marauding tribes. In spite of such means of transport, the desert is still an almost impassable barrier.

The Atlantic coastal region of the Sahara south-west of the Atlas Mountains belongs to Spain, as do also the high, volcanic Canary Isles which rise steeply from the Atlantic Ocean off the northern part of this district. The part of the Mediterranean coast which includes Tripoli and Barka, together with the desert extending southward to just within the Tropic of Cancer, belongs to Italy ; the region as well as the chief town is named Tripoli. East of this Italian region and of the French territory south of it, is the Egyptian part of the Sahara known as the Libyan Desert, and across the narrow valley of the Nile the Nubian Desert continues the same kind of country as far as the Red Sea.

The Sudanese Savanna Lands.—South of the great desert stretches a region known as the Sudan, from the Anglo-Egyptian Sudan on either side of the Nile, westward through the Central and Western Sudan areas as far as

the coast lands where the Senegal and Gambia rivers enter the Atlantic Ocean. Just as the characteristics of the Sahara region are due largely to the lack of rain, so conditions in the Sudan are due largely to the amount of the rainfall and the season of the year at which it comes.

In the summer time as the sun is overhead, or nearly overhead, at mid-day the heat is therefore very great ; the isotherm map in the atlas shows that the mean July temperature is not far from 90° F. At this season the wind comes from a more or less southerly direction and contains moisture from the Atlantic Ocean over which it has blown. After the sun has reached the highest point in its daily journey, the air is so heated that it rises, and in rising is cooled considerably until it can no longer hold the water-vapour it contains. Then heavy clouds form and rain falls in amounts scarcely to be realised by people in cooler lands. Every afternoon the rain comes down in torrents, sometimes in even heavier falls during tropical thunderstorms ; hence the summer is usually referred to as the rainy season.

The clouds hide the sun and so prevent the heat becoming as great as it would otherwise be ; consequently the mean temperature of the twenty-four hours is lower during the rainy season than during the months which precede it. This is shown clearly by the temperature and rainfall graphs for the Sudan in Fig. 2, on p. 19.

At the opposite season of the year, the mid-day sun is overhead at the southern Tropic, and therefore lower in the sky in the Sudan. Yet it is still high, and the mean temperature for January is near 80° (see the isotherm map and the temperature graph). The season can scarcely be referred to as " winter," but it may perhaps be called the " cool " season. At this period the conditions are more like those of the desert ; the trade wind blows from the north-east, and the air is dry. When it blows

strongly it may bring so much dust from the desert that the sky is covered and the sun almost invisible ; this dry north wind is called the Harmattan. There is no sudden change from the climate of the Sahara to that of the Sudan. On the northern margin of the latter the wet season is short and the rains are light, while farther south the season gradually becomes longer and the rains are heavier.

Corresponding with the difference of climate is a difference in the natural vegetation. Broadly speaking, the Sudan is a grassland, for the grass grows up in the rainy season and dies down in the dry season, whereas trees cannot exist without water during the period of drought. Hence such trees as can survive are found either by the courses of the streams where water percolates through the soil to their roots, or scattered singly over the country that their roots may have a large space of ground in which to stretch out and seek what moisture is to be found. On the northern margin of the Sudan the growth of the grass is scanty ; for example, small tufts appear between the bushes of the scrub-land. Further south, the tufts are larger and the grass grows to a considerable height, often to as much as 10 feet, and in parts there are tangles of the giant " elephant-grass " which reaches 15 feet. In the cool season when the grasses have withered and only heaps of brown stalks remain, the country has a desolate and bare appearance.

These tropical grasslands are called savanna lands, and must be distinguished from the steppe lands or temperate grasslands of cooler latitudes. The trees in the northern part of the Sudanese savanna are stunted and few in number ; further south they are larger and more numerous, and the country is described as a " park-land." These trees generally lose their leaves during the dry season, and so can manage with less water as

moisture is no longer transpired through the leaves. On the southern margin of the grass-lands, there is a shorter dry season with which the trees have to contend ; they are therefore more numerous and some retain their leaves throughout the year ; consequently the country begins to resemble the forest lands of the equatorial regions.

The savanna lands of Africa are the home of many wild animals, for the grass gives pasture to herds of zebras, buffaloes, and several kinds of antelopes ; giraffes and elephants are also herbivorous animals which feed on grasses and shrubs. Carnivorous animals, such as lions, hyænas, and wolves, prey upon the defenceless grazing ones, and hippopotami are found in the rivers. All these animals are hunted by men either for the sake of sport or for such products as skins and ivory.

The Sudan may be divided into four areas, according to its river-systems :

(1) In the west, the Senegal and Gambia rivers flow westward through rather low country to the Atlantic Ocean.

(2) Near their sources are the head streams of the Niger, which flow northward over a plateau land. This plateau has a high edge overlooking the low coastal lands of the Gulf of Guinea, and dips gently northward towards the Sahara. The Niger at first flows in this direction but bends near Timbuktu, in the scrub-land region ; it then flows to the south-east, where it breaks through the edge of the plateau in a southerly turn (Lat. 10° N.) with unnavigable rapids. A little lower it receives much water from its large and navigable tributary, the Benue.

(3) East of the Niger, a number of streams flow into a depression in which lies Lake Chad. This is a lake of inland drainage on the margin of the Sahara ; it is slowly

drying up, and near it are deposits of salt which is taken by caravans to the dwellers in the savannas and in the oases of the desert.

(4) In the Anglo-Egyptian Sudan the streams, such as the Bahr-el-Arab and the Bahr-el-Ghazal, drain eastward to the Nile.

Because the Sudan grasslands extend across the continent, they have provided a route by which various pastoral tribes of the black and woolly-haired negro race have spread from eastern Africa westward, and thence penetrated the forests which lie to the south in the Congo region and the Guinea coast-lands. Similarly Arabs migrated westward, taking with them the art of cultivating the banana, cotton, sugar-cane, rice, and hemp. By the same route the Mohammedan religion extended, and it was also brought by raiding tribes which came from the Atlas Lands and the Saharan oases. Among these northern invaders were the Fulas, originally herdsmen, who formed a great empire extending over nearly all the central and western Sudan about two centuries ago. Handicrafts, such as working in iron, brass and leather, and weaving, were carried on by the new-comers, and trade took place from these grasslands and the forests on the south, across the Sahara, to the Mediterranean lands of the north. Towns grew up as centres of the caravan trade, such as Timbuktu close to the northernmost bend of the Niger.

The northern and therefore drier part of the grassland is a cattle-rearing country; there is abundant pasture during the wet season, but at the latter part of the dry season the cattle must be driven down to the river valleys or eke out a precarious existence on the young growths of the shrubs or on a sort of grass which springs up after a tract of bush has been burnt off.

The southern part has more rain and consequently

cultivation is more important, though irrigation is sometimes necessary. Millet and maize are grown as food, and ground-nuts are largely exported, while cotton is now being increasingly produced under the stimulus of the French and British governments and of the French and British cotton manufacturers, who need fresh sources of supply for their raw material.

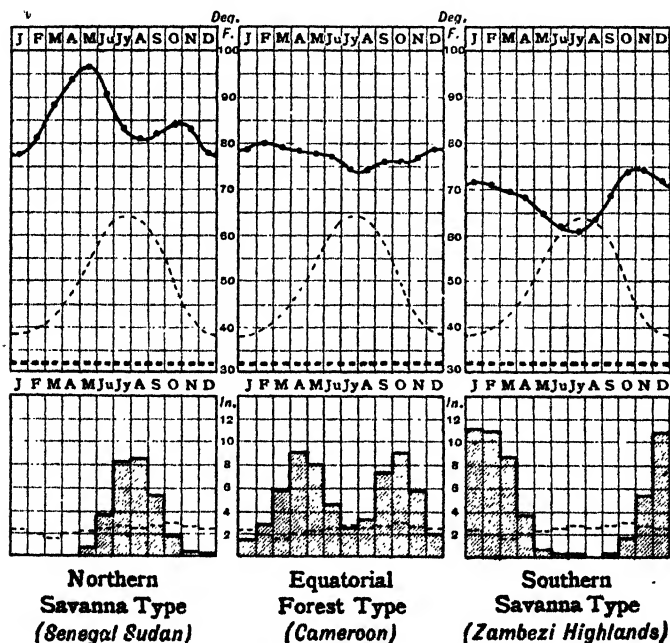


FIG. 2.—Climate Types in N. and S. Africa.

(The thin broken lines show the temperatures and rainfall at London.
The thick broken line shows freezing-point, 32° F.)

The Equatorial Forests.—South of the savanna lands are the equatorial forests, regions of considerable heat and rain throughout the year. The mid-day sun is overhead at the Equator on March 21, and for some weeks before

and after that date it is not far from overhead ; during March and April, therefore, there is great heat at mid-day, followed by very heavy rains due to the rising of the heated air. The clouds shelter the earth from the sun and so keep down the temperature ; therefore although the sun is overhead and the heat is great at mid-day, the average temperature of the rainy season is not higher than at other times of the year. Later, in June and July, the mid-day sun is overhead in the latitudes near the Tropic of Cancer, and at the equator the heat and rain are less ; but in September and October, the mid-day sun is again overhead in equatorial latitudes, and there is another period of heavy rainfall. Then in December and January, the mid-day sun is south of the equator and near the Tropic of Capricorn, and the equatorial regions again have less rain. Examine the temperature and rainfall graphs of the Cameroon region shown in Fig. 2, on p. 19. Thus, although in these regions there are two periods of maximum rain, there is no period of drought, the temperature is almost uniformly high throughout the year, and so vegetation can grow without interruption. Here is the equatorial " rain forest," often a dense mass of vegetation formed of great trees of very many varieties, which break into leaf and flower at different times during the year. From the trees hang great lianas or creepers, and at places there is an undergrowth of smaller saplings, dwarf palms and other plants, while elsewhere the forest is like a " roof garden on pillars." " Above in the dazzling sunshine is a sea of verdure aglow with islands of gaudy colours, on and in which gorgeous insects, birds, tree frogs, and numerous small mammals are extremely busy. Below, lies a stupendous gloomy vault, crowded with pillars, encumbered with ropes and cables, hung everywhere with baskets of foliage, and laid with a soft and

elastic brown mat, hidden here and there by a mass of broad variegated leaves. . . . This great gloomy forest hall appears to be deserted by animals. An awe-inspiring silence prevails, except for an occasional reminder of the life above. Animals can hardly be perceived owing to the subdued colours of their skins. The buzz of mosquitoes is heard, an occasional newt, lizard, or snake is seen, but no other sign of life is apparent."

Yet the traveller may break the silence, and then "myriads of mosquitoes would settle on him and drive him distracted by their bloodthirsty attacks. Parrots, affrighted in their solitary haunts, would fly away with ear-piercing shrieks, and monkeys, indignant at the unwonted intrusion, would fill the formerly silent solitudes with their noisy clamour." Elephants still exist in the forests, though many have been killed, and in the rivers are hippopotami and crocodiles.

Men find it difficult to live in the equatorial forests, for the climate is too constantly hot and moist for people of most races, and even those negro tribes who have become accustomed to it suffer from various "tropical" diseases. Both these diseases and also the climate are partial causes of the low mental development of the native peoples; such qualities as activity, energy, and perseverance are scarcely possible in the enervating atmosphere of these regions.

Some of the people are hunters and fishers, others get their living by collecting the natural products of the forests: fruits, nuts and roots. Some cultivate the ground; for this purpose clearings have to be made, and usually the agriculture is of a very primitive kind and gives a poor yield. In the northern part of the equatorial forest region of Africa the banana is the typical product; in the southern part the manioc or cassava becomes more important. From the root of the manioc a starchy food

is obtained, and tapioca is made from this by roasting. The manioc exhausts the soil very quickly and the clearings round the villages have to be changed ; this involves hard work, for the axes of the natives are small and weak and the forest growth is difficult to remove. During recent years, Europeans have entered the regions for the sake of the various products, more especially rubber and timber ; they have forced or induced the natives to gather and transport these, and in some parts have introduced new crops and improved the methods of cultivation. Yet still the forests are on the whole scantily populated and their resources are largely undeveloped.

The Guinea Coast Lands.—From the mouth of the Senegal southward and eastward to the delta of the Niger, there is a relatively narrow coastal plain between the grassy plateau of the Sudan and the ocean. Most of this coastal lowland is covered with forest and the part bordering the Gulf of Guinea has a climate of the equatorial type. Between the forest and the sea are many lagoons and the coast is constantly beaten by heavy surf.

Here, as in many other lowland coasts of tropical lands, the meeting of land and sea is in mangrove swamps. The mangrove tree has its roots in the water and overhanging branches send down other roots, so that the tree stands, as it were, on many legs and grows in such profusion that it makes a barrier very difficult to pass. Also, its roots hold between them sand and mud which would otherwise be swept away ; thus the whole district becomes a swamp, neither land nor sea, harbouring insects and disease, useless and dangerous to man.

The forest is a barrier to the nomadic peoples of the north, for in it lives the tsetse fly which carries a disease fatal to their animals. The surf and the shallow sea make

it very difficult for vessels to reach the shore, and in the lagoons breed the mosquitoes which carry the malaria so fatal to man. Thus the coastal lowlands have not yet been colonised either by the Mohammedan invaders from the north or by the Europeans who have come by sea. Mohammedanism seems to be slowly taking the place of the superstitions and witchcraft of some of the negro tribes, and in recent years Europeans have introduced Christianity, but the mass of the people are still pagan. European influence has had greater effect in modifying the occupations, that is, the economic life of the people.

A trade in rubber has developed. At first it was collected from the wild lianas, and the collection was sometimes connected with great abuses, either intentional or unintentional. Natives in certain parts were forced to the work and ill-treated ; in other parts they were paid, and paid so well that they gave up their work of growing food, and cultivation suffered ; the natives' habits of life were changed and their clearings were overgrown. Yet their new occupation was unable to replace their agriculture, as a means of support, for they destroyed the lianas by recklessly cutting them down to obtain the juice, and the rubber supply declined. Now Europeans are introducing from the Amazon region the Para rubber tree, from which more and better rubber is obtained than from the native plants.

Other commodities exported by European traders are the palm kernels and the oil pressed from them, ground-nuts from which also oil is obtained, mahogany and teak, and cocoa. From the " Gold Coast " gold is still exported, though in rather small quantities, but the " Ivory Coast " yields very little ivory, and from the " Slave Coast " no slaves are now sent. The Europeans stopped their own trade in slaves early in the nineteenth century, and later put an end to that which was carried on by Arab and

other Mohammedan slave-dealers. Yet slavery still exists in the region, even though the laws of the British and French governments do not recognise it.

“ West Africa.”—The whole region between the western Sahara and the Gulf of Guinea is often known as “ West Africa.” Europeans formed trading settlements at a number of points on the coast, and in one way and another their governments gained control of the neighbouring districts and then extended their power inland ; thus each possession includes both the forested coastal lands and the grassy plateau in the interior. Britain rules over Nigeria, the Gold Coast Colony, Sierra Leone, and Gambia. France holds a great part of the savanna region and comes to the coast in Dahomey, the Ivory Coast, French Guinea, and Senegal. A small part of the Guinea lowlands is in the possession of Portugal, which also possesses the Cape Verde Islands, a group of islands lying about 300 miles off the cape of the same name.

Before the Great War, Germany owned Togoland between the British Gold Coast on the west and French Dahomey on the east, but after the war Togoland was divided and the government of the western part was entrusted to Britain, that of the eastern part to France. These countries were not given the absolute ownership of the divided territory ; they were given a “ mandate ” to govern it under the supervision of the League of Nations. They undertake to govern the mandated territories for the benefit of the inhabitants and not to permit slave-trading, or the sale of arms or intoxicating liquors to the natives. These last provisions are put in because again and again in the past there have been terrible tribal wars between the native peoples, and because they very easily give way to indulgence in alcoholic drinks to such an extent that they are ruined both

mentally and physically. The states to which mandates are given also undertake to allow all other members of the League of Nations equal trading rights with themselves. To ensure that these provisions and promises are carried out, the mandatory powers send in an annual report of their government to a Permanent Mandates Commission of the League of Nations consisting of nine representatives of some of the chief nations ; this Commission examines the reports in order that it may advise the League of Nations in supervising the government of the mandated areas.

Liberia is an independent state, so called because it was made a colony for freed slaves returned from the United States of America. At first the natives objected to the settlement of these people and there were struggles and battles between them ; at length the freed slaves got the victory, and in the middle of the nineteenth century a Republic was established with a government like that of the United States. This government is in the hands of a few thousand descendants of the freed slaves, who speak English and profess the Christian religion, and they are virtually the rulers of nearly two million uncivilised and pagan negroes. The country is little developed in any way ; the government has had to be assisted by a loan of money, and by officers appointed by the United States to manage the money affairs and the police force of the Republic. The capital is called Monrovia, after a president, Monroe, of the United States.

Both good and ill effects have followed the coming of the Europeans to West Africa, as indeed to all other tropical lands. The earliest results were disastrous to the natives, when spirits and arms were imported, and slaves with other " merchandise " were exported by any traders who were willing to run risks of disease and death for the sake of the great profits. But now orderly

government is being established, the bloodshed and tortures that the natives inflicted on each other are being put down, and the diseases which take such a heavy toll of human life are being checked.

Climate and disease have given to part of the coast region the name of "the White Man's Grave," and it is most unlikely that white people will ever be able to live and work in this region; at present it is usual for the traders and officials to stay only a few years and then return to Europe. The fact that Europeans cannot make colonies here has been fortunate for the natives, for their land has not been taken from them by white settlers; also it is to the advantage of the traders to have numerous and healthy labourers to produce the commodities for export, and a prosperous population to buy the manufactured goods which are imported.

To help the trade, railways have been built into the interior from the ports; this has been a great gain in many ways, for previously the sole way of transporting goods was by caravans of negro porters who carried burdens along the tracks which were the only roads of the region. Also better roads have been made and motor traffic is increasing, while at the ports breakwaters have been built so that ships can load and unload in safety.

Education of the natives has been begun by the French and British governments. A report on French West Africa says: "It must be recognised that so far few of the children receive education; with some 200 schools only 11,000 can be taught out of over 800,000. The aim of the schools is above all to teach the French language—the teachers are compelled to teach in French only, and are forbidden to use the native dialects; and practical teaching, though required in theory, is in practice much neglected." In all the primary schools this practical teaching deals with agriculture, but in some

of them manual work and the local industries are also taught.

When one surveys the various activities of the governments one may hope that they will prove a great gain to the people of West Africa.

The Cameroons and Congo Region.—Between the Lower Niger Basin and the Congo Basin rise the Cameroon Highlands. The highest point, the Cameroon Mountain, is a great volcano which rises over 13,000 feet from the shores of the Bight of Biafra. To the south-west, similar volcanic masses emerge from beneath the waters of the Atlantic and form the line of islands, of which Fernando Po belongs to Spain, and Prince's Island and St. Thomas (called by the Portuguese, Príncipe and San Thomé) belong to Portugal. The volcanic rock weathers to a fertile soil, and especially on San Thomé there are great plantations of cacao, from which cocoa is obtained.

The Cameroon Highlands are forest clad on the lower slopes and plateaus, at higher elevations there are tree-ferns (that is, ferns which have the size and somewhat the appearance of trees), then still higher, where the heat is less, an open woodland appears. Above 7000 feet, the air is cool and there is less rain, for most of the water-vapour has been condensed before the air has risen to this height; here there is a grassland which resembles that of temperate latitudes, and near the summits of the Cameroon, heather and mosses, partly covering bare rock, have recalled to travellers the appearance of the Scottish Highlands. The change from dense forest to temperate woodland, temperate grassland, and then a scanty vegetation and bare rock, is that usually found on the high mountains near the Equator.

The Cameroon region used to be German, but like Togoland it has been divided into two portions: a small

western strip has been given under a mandate to Britain, and the remaining part is governed by France under a mandate.

South of the Cameroon Highlands, some rivers run directly to the Atlantic, but the greater part of this region drains to the Congo, which is over 2500 miles long. The central part of the Congo Basin is a vast plateau, little more than 1000 feet in elevation and surrounded by higher lands ; from these marginal regions many streams flow, at first with rapid courses and then, when reaching the level plateau, with reduced speed, so that they drop their load of silt and are encumbered with sandbanks. At times of floods the waters spread widely over the neighbouring country, and many districts are always marshy. The main river has cut a great gorge in the western rim of this saucer-shaped region and escapes by a long series of rapids called the Livingstone Falls, after which it has a short course of about 100 miles across the narrow coastal plain to the sea. Thus, great as the Congo River is, it is of limited value for navigation. The capital of the Belgian Congo, Boma, is at the head of its estuary, and ships can continue past Boma to Matadi, at the beginning of the rapids. Then a railway must be used to get to Leopoldville, above the rapids ; here the water of the river, held up by the mountain rim, spreads out into a lake called Stanley Pool. From this point the traffic can again go up-stream about 900 miles to Stanleyville, where again a series of rapids, called the Stanley Falls, has to be circumvented by a railway. Then comes another stretch of navigable river, but a third series of rapids necessitates a third railway to reach the upper waters of the Congo.

Even with their rapids, shifting shoals of sand and obstructing masses of vegetation, the rivers are more useful for communication than the few roads of the

region, and most of the land transport has to be done by native porters using the narrow tracks which form a network through the forests ; animals cannot be used because of the prevalence of the diseases carried by the tsetse fly.

The margins of the region are better drained ; they are either clothed with forests of a more open kind than those of the lower regions or they are grasslands of the savanna type.

There are only a few thousand white people in the whole vast area ; how many natives there are is not known, but certainly there are several millions. Most of them belong to the tribes of negroes who are known as Bantus, speaking dialects of the Bantu group of languages. The Bantus appear to have migrated from the grasslands of the north-east, and brought with them the knowledge of the agriculture which they still carry on, though with difficulty, in the forest regions ; the keeping of animals, which the Bantus of Eastern Africa practise, is impossible here.

These negroes appear to have displaced from the better lands a poorer set of people, who remain in the denser and most undesirable parts of the forests. Such are the pygmies, who have no skill in cultivation ; they move from place to place, getting their living by hunting, and often bartering the meat for agricultural produce from the more settled Bantu tribes.

Sleeping-sickness is a terrible disease which has ravaged most parts of the Congo Region and has probably caused a great reduction of its population. Like malaria, which is also a great scourge here, it is carried by a species of mosquito, and little has been done in this region to combat the disease.

White traders have as yet been unable to develop the region. They are greatly hindered by the difficulties of

transport ; for example, very little of the timber can be got to the coast, for it is too heavy to bear the cost of carriage on the railways which evade the falls. There are some cocoa plantations, but the chief products have been palm oil and kernels, and rubber. Recently the wild rubber industry has declined and the attempts to cultivate the Para rubber tree have been largely unsuccessful.

The collection of the forest products of course needs native labour, and this has usually presented difficulty. The white men have forced the negroes to the work, sometimes with cruelty, and many people think that the existence of the rubber has been a great curse to the region. Since the rubber supply declined, many natives who had left their agriculture and taken to collecting, turned to the gathering of a gum called copal obtained from the roots and branches of a large tree.

Ivory, now only obtained in small quantities, was one of the main attractions which led to the formation of the Congo State by King Leopold II. of Belgium. After the explorer Stanley made his great journey across Africa in 1874, from the east coast to the Congo head-streams and thence down the river till he discovered where it reached the sea, King Leopold got him to return and make treaties with a large number of native chiefs, so that Leopold could have a monopoly of trading in their territories. Later, the king arranged with the European governments that they should acknowledge his rule of the whole region, and he formed the Congo Independent State.

His rule was a very bad one ; the desire for gain led to great abuses, cruel treatment of the natives, raids, and attempts at rebellion, and things became so bad that in 1907 the personal government of the king was removed, and the state was put under the Belgian Parliament, its name being changed to the Belgian Congo.

The French have acquired a large area which extends from the Lake Chad region southward between the Cameroons and the Belgian Congo to the Atlantic. The Belgian territory reaches the sea only by a narrow strip at the mouth of the Congo between French Equatorial Africa and the Portuguese territory of Angola, which includes part of the Congo Basin south of the river. A small coastal area in the south of the Cameroons district belongs to Spain.

The Angolan and Rhodesian Savannas.—South of the Congo Basin is a higher plateau region. Most of this is over 3000 feet in height, while on its north-eastern and western margins there are considerable areas with an elevation of 5000 feet. In its climate and vegetation this region corresponds with the Sudan. When the mid-day sun is overhead, in December and January, there is the hot season with the rains, while in June and July there is a cool dry season. The sea-level isotherms indicate temperatures of about 80° in the hot season and over 70° in the cool season, but great allowance has to be made for the elevation. If the mean height is taken as about 3000 feet, 10° would have to be subtracted from these figures to obtain the actual temperatures. The graphs of temperature and rainfall for the Zambesi Highlands (Fig. 2, p. 19) refer to a place at this elevation, and it is to be noted that the cool dry season comes in June, July, and August. The heaviness of the summer rainfall is partly due to the height of this district.

The temperatures in this region are considerably lower than those of the Sudan (compare the two graphs), and on the whole, the region is suitable for European colonisation. This is particularly true of the still higher Bihe plateau of western Angola, which is free from such diseases as sleeping sickness and malaria.

The greater part of the region is a grassland, but with occasional trees and clumps or belts of woodland, and even with patches of forest. The Bantu negroes, who are the chief inhabitants, get their living mainly by keeping cattle, but they are not nomadic. They have their tribal grounds, on which their cattle graze, and within this area they grow a certain amount of food, particularly maize and millet. The north-western coastal strip (marked off on the map in Fig. 1, p. 11) is lowland ; it has less rainfall and its natural vegetation is poorer than that of the rest of the region.

These savannas of Angola and Rhodesia are drained by rivers which flow out in every direction. From the Bihe plateau there are streams draining westward to the Atlantic, northward to the Congo, eastward to the Zambesi, and southward to a hollow in the Kalahari region where the waters spread out in swamps and then dry up. The north-eastern part of the savannas is drained through Lake Bangweolo to the head-streams of the Congo. The Zambesi collects the waters of all the remaining part of the plateau except a small area in the south-east. Where the Zambesi leaves the plateau in its lower course there are rapids, but the greater Victoria Falls are higher up.

Three European Powers have acquired this region. Angola, the western part, is Portuguese territory ; a small part of the Congo drainage area, known as the Katanga region, is in the Belgian Congo ; the lower Zambesi Valley forms part of Portuguese East Africa ; the remaining area forms the British territory of Rhodesia.

The agricultural resources of the region are considerable, but as yet little developed ; minerals, too, are widespread and will probably become important. Gold, copper, coal and iron are known to exist, but are little worked, in Angola ; there is a considerable production

of copper and a smaller production of tin and coal in the Katanga district of the Belgian Congo. In the Rhodesian region, there are gold, copper, coal, and other minerals, as well as great opportunities for pastoral and agricultural production. Rhodesia will be more fully described in the next book of this series, as will also the other parts of British Africa.

The following sections deal very briefly with the physical geography of British South and East Africa, in order that the general build and climatic conditions of the whole continent may be understood.

The Southern Desert and Kalahari Scrublands.—These regions in some ways correspond with the Sahara and its margins, but they are smaller and the area of true desert is confined to a coastal strip. In these latitudes the trade winds blow from the south-east across the Indian Ocean, and deposit moisture on the eastern coasts of Africa, but the rainfall decreases after the eastern rim of the highlands is passed; consequently the relatively low Kalahari plateau has a poor water supply, and the western coastal region is practically rainless. The map in Fig. 1 (p. 11) shows that the desert strip extends northward to nearly latitude 15° , and the semi-desert region stretches still further along the coast. This northward extension is due to an ocean current of relatively cold water which flows northward along the African shores and chills the air above. Fogs and mists therefore occur along the coast, but when winds blow from the sea to the land they are warmed and consequently do not yield rain as is the case in most coastal regions. Hence the coastal strip is relatively dry, and even off the southern part of the Angola highlands, the lowlands are desert or semi-desert. The graphs for Walvis (or Walfisch) Bay in Fig. 3 (p. 34) show the temperature and rainfall conditions

for a place almost on the Tropic of Capricorn, and at sea-level. Note how low the temperatures are for such a latitude and how little rain there is for a coastal region.

Within the scrubland and desert regions there are only two permanent rivers, one in the north which flows from the Angola Highlands along the boundary between

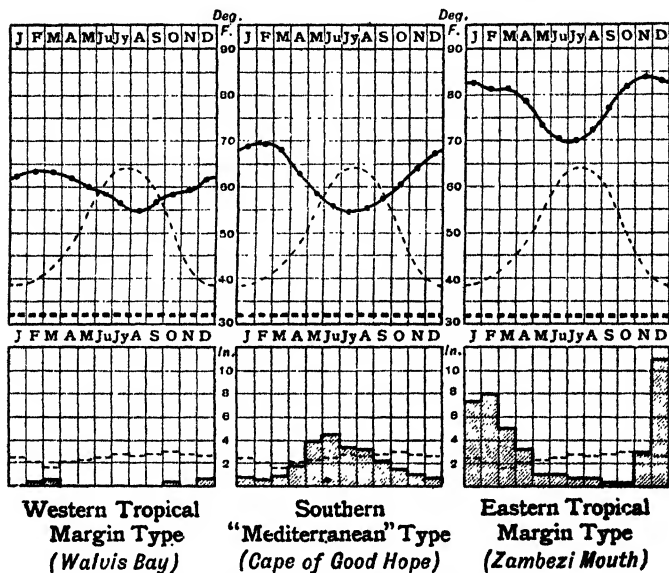


FIG. 3.—Climate Types in South Africa.

Portuguese and British territory, and in the south the Orange River which obtains its water from the mountainous eastern rim of the continent. For the rest, the streams flow only after rain and lose themselves in temporary lakes, swamps, or salt pans. The Kalahari region should not be called a desert; it is a scrub-land with thorn bushes, poor pastures, and even some trees.

The Cape Region.—It will have been noticed that

going southward from the equatorial forest region there is the same change of conditions, first to savanna land, then to scrubland and desert, as is found going northward through the Sudan to the Sahara. Similarly the southernmost region, that of the Cape of Good Hope, corresponds in climate and natural vegetation to the northernmost one, the Mediterranean region. Compare the graphs for the Cape of Good Hope in Fig. 3, p. 34, with those for Gibraltar in Fig. 5, p. 67.

In its summer (December to March) the Cape Region is dry, for the westerly winds with their rain-bringing cyclones blow only across the ocean to the south, but in its winter (May to August) these winds are found further north and bring rain to a strip of country along the southern coast of the continent. The natural vegetation is of the Mediterranean type, that is, of evergreen trees and shrubs ; also such cultivated products as the vine, wheat, and fruits are obtained, and the region is colonised by Europeans.

The Natal Region.—Beyond the Cape Region along the eastern side of the continent, there is an area in which the prevalent south-east winds come from the ocean and bring some rain at all times of the year. These winds and the resulting rains are most marked in the summer, when the land behind is heated more than the ocean, as may be clearly seen from the January temperature map in an atlas. Then the air above the land is heated and an area of low pressure is formed. To this area the wind blows in from the ocean and in the low-pressure region it is forced up to considerable altitudes. Consequently the air is cooled, the water-vapour brought from the ocean is condensed, and rain falls.

This group of phenomena (namely, greater heat over the land, consequently lower pressure of the air, inblowing

winds, rising air, and heavy rainfall) is found in several parts of the world where the land is heated more than the adjoining ocean in summer time, and it forms what is called a monsoon system. This monsoon system of south-eastern Africa is not as marked as that of Asia or that of Northern Australia, for it does not result in a complete change of the wind system as in those continents, but it increases the strength of the winds and the rainfall during the summer season.

Latitude 30° passes through this region ; it is therefore outside the tropics and belongs rather to the temperate zone. Yet it is on the equatorial side of this zone ; the summer heat is considerable and even the winters are warm ; note that the isotherms show temperatures of over 80° and 70° for these two seasons, and compare these with those of Europe. Hence the region may be described as " Warm Temperate." As the land rises inland to the Drakensberg Mountain crest the temperatures become lower ; consequently while the region produces such things as cane-sugar in the hotter part, and tea on the slopes, the uplands yield temperate products and give grazing lands for cattle and sheep. Although there are European colonists there are still many more coloured than white people in Natal and the adjoining part of the Cape of Good Hope.

The Karroo and Veld Regions.—These areas (marked K and V on the map of Natural Regions) lie behind the mountain rim, and have considerably less rainfall. They are upland areas, and although the summers are hot the winters are relatively cool. The Karroo Region of the Cape of Good Hope has a rather scanty rainfall, and is a poor pasture land, with grasses and thorn bushes. The Veld of the Transvaal and Orange Free State is better watered, and in addition to pastoral work there is cultivation

of maize and other crops. The plateau regions have also mineral deposits, the gold of the Transvaal being specially important in attracting white men to a country mainly peopled by Bantu negroes. The four provinces, Cape of Good Hope, Natal, Orange Free State, and the Transvaal, together form the Union of South Africa, one of the great self-governing Dominions of the British Empire. In the Union there is a white population of less than two million, and a coloured population of nearly six million persons.

The Mozambique Region.—The Tropic of Capricorn passes through this region, which almost falls within Portuguese East Africa, also known as Mozambique. There is a hot and rainy season, with much less rain during the cooler period of the year, and the climate of most of the region is unsuited for white men. Observe the climate graphs for the Zambesi Mouth district in Fig. 3, p. 34. Moreover, the lowlands are infested both with the tsetse fly and with the malaria-carrying mosquito. The natural vegetation of the southern area is of the thorny and bush type, but in the north where the rainfall is greater there is forest.

Here, as in all tropical regions, there is a marked difference between the agriculture of the natives and that of the European owners of the plantations. The native or his wife prepares the little garden by burning the vegetation which covered the spot, cultivates it with the hoe, plants small crops (for example, millet, maize, pumpkins, beans, and cassava); he or she grows just enough for the needs of the family, that is to say, for their food, with a little extra to provide for the government's hut-tax and for buying some cloth, beads, or wire.

The European planter works on a large scale. He buys or rents a large area of land, obtains agricultural machinery

from Europe or America, imports seeds or plants from other regions where climate and soil conditions are similar, and often uses scientific methods. He employs large numbers of native workers of both sexes and all ages, and pays them a wage on which Europeans could not possibly live ; for example, in this region the average wage for men has been about 2s. a week, for women about 1s., and for children rather less.

Scientific methods of farming and the use of machinery result in the workers producing far more than in their native fashion. They may live on the wage given as comfortably as they would have done in the old way, and in addition there is a great amount of food or other material able to be sent away for the use of people elsewhere. From the point of view of the European planters and of the European consumers of the goods in other lands, the plantation system is a great advantage, and if it is fairly carried out it may be an advantage to all concerned. One abuse of the system has been the way in which some of the land has been obtained, for the natives have sometimes been simply turned off, or the land may have been bought by giving in return things of practically no value. Other abuses which sometimes exist are due to the difficulty which the planters may have in getting sufficient labour ; the natives may prefer to live in their own fashion and may not want to leave their land and work for a white man ; then there may be some form of forced labour, even now that slavery is abolished. For example, a tax may be put on the natives and so they are forced to work to obtain the money, or the government may make arrangements with a planter for him to have land on condition that he pays the natives' taxes and forces them to work for him for so many days in return.

Yet if the plantation system is fairly and wisely

carried out, it may be a good one even from the natives' point of view, for they may obtain what they consider to be a good living, and moreover they will have more security in their food supply, which in the case of a failure of the usual rains would seriously suffer under their poor methods of cultivation.

The chief products of the plantations of this region are sugar, ground-nuts, maize, copra (the dried kernels of the coconut palms which are grown in a narrow belt by the sea), oil seeds, rubber, tobacco, and sisal hemp, a fibre obtained from the stems or "poles" of the sisal plant.

Portuguese East Africa is crossed by two important rivers from the interior of the continent, the Limpopo and the Zambesi; similarly it is crossed by two important lines of railway from the interior. In the south is the line from the Transvaal ending at the port of Lourenço Marques, and further north is that from Rhodesia ending at Beira. Managing the government of the country, the plantations and the commerce are a few thousand Europeans (mainly Portuguese); there are also a few thousand Asiatics, mainly Arabs and Indian traders who keep the small stores used by the natives; the bulk of the population of about three million people is composed of Bantu negroes.

Madagascar.—This great island lies off Portuguese East Africa; its area is about equal to that of France, by which country it has been acquired. It is block-like in its structure; its eastern side rises precipitously from the Indian Ocean, while on the west it descends by a series of terraces to the lowlands bordering the Mozambique Channel which separates it from the mainland of Africa. The eastern slopes receive very heavy rains from the winds which blow from the Indian Ocean throughout the year; the rainfall is less in the interior and on the

western coasts, while in the south-west, in the same latitude as the Kalahari, there is a semi-arid district. The natural vegetation differs in the three natural regions shown in Fig. 1, p. 11. It consists of forest on the eastern slopes and over most of the coast lands; the interior is a region of rolling moor-like plateaus covered with a coarse grass during the rainy summer and intersected by fertile river-valleys; the south-western region is a poor scrub-land.

The population of about four million people depends upon cattle-rearing and cultivation, rice being the chief food. The people belong to the Malay race, as do many other island dwellers, especially of the Pacific Ocean. On the western coast there is a considerable Bantu element; also Arab seamen and traders have settled here, and there are European officials and planters. The chief port, by which the plantation products are sent away, is Tamatave, connected by railway with the capital Antananarivo, built on a ridge in the healthier upland region.

The Zanzibar Region.—The coastal region of the mainland of Africa from about Lat. 10° S. to near the Equator is a lowland which has great heat and rainfall throughout the year. This region therefore has a climate like that of the Guinea coast lands and has a forest vegetation of a similar kind. It has plantations, and the islands of Zanzibar and Pemba are famous for their cloves. Like Portuguese East Africa, it has trade passing by railways from the interior to its ports, and its population consists mainly of Bantus, with an admixture of Asiatics, and few Europeans. It forms part of the British territories of Tanganyika and Kenya.

The Eastern African Highlands.—These consist

mainly of great plateaus several thousand feet high. The slopes leading to the plateaus have much rain, but the interior part of the region is relatively dry. Also the elevation causes lower temperatures, so that the climate is not of the ordinary equatorial type. The region is therefore not forest but savanna land, and pastoral work with some agriculture is the common occupation of the Bantus. The higher portions are well suited to European colonisation, but the number of white inhabitants is as yet small.

An important feature of the region is the number of lakes of considerable size. The broad Victoria Nyanza (Nyanza means Lake) lies in a shallow depression, but the others lie in long, narrow, and deep troughs, formed by the cracking of this part of the Earth's crust into huge blocks. Some of these blocks are long and narrow and have been let down between the parallel cracks or faults which bound them on either side ; such low faulted areas are known as rift valleys. Compare this formation with that of the Rhine valley between Mainz and Basel, and of the Midland region of Scotland.

The forces within the Earth's crust that have thus disturbed it and broken up the surface have also forced out great masses of molten material at numbers of places on the edges of the rift valleys ; these form volcanic cones, such as Kenya and Kilimanjaro, which rise above all forms of vegetation and are capped by perpetual snow. " Kenya, situated right on the Equator, has several small glaciers. So anomalous did this seem when the country was first explored that geographers at home refused to believe the early travellers who reported perennial snow in this torrid zone, and they tried to explain away the white cap the pioneers claimed to have seen from afar."

The south-eastern part of the region belongs to Portuguese East Africa ; the western edge is in the Belgian

Congo States ; most of the remainder is within British East Africa, which includes the Kenya Colony and the Uganda Protectorate, and also the Tanganyika Territory which was German but is now governed by Britain under a mandate.

The Somali Scrub Lands.—Because of its shape this region is sometimes called the “Horn of Africa.” Although it is part of Africa, its climate depends on Asiatic conditions, for as the three continents, Europe, Africa, and Asia, form one great land-mass, the natural conditions necessarily extend from one part to another across the artificial political boundaries.

The Somaliland region is affected by the great monsoon system of Asia which will be described and explained in a later section. In the northern winter it receives dry north-east winds similar to the trade winds of the Sahara and Sudan regions ; in the northern summer the winds are reversed, and come from the south-west. Therefore they come from a land area, and moreover blow parallel with the coast and with the edges of the higher lands of the interior and are not forced to rise over heights ; consequently they give little rain. The region is semi-arid, and as it has an almost uniformly high temperature (note that the isotherm maps show that this is never far from 80° at the sea-level), its vegetation is largely of the thorn-bush type and the country has a parched and dry appearance.

The population is necessarily scanty ; most of the people are nomadic, tending their cattle and sheep, and depending upon horses and camels for transport. The Somalis belong to the Hamitic race ; they are fanatical Mohammedans and have resented the acquisition of their country by Europeans, fighting repeatedly against the British, French and Italians who now govern the greater part of Somaliland.

The Abyssinian Highlands.—These highlands are formed of a great block of hard rock, through cracks in which volcanic lava has been poured out in sheets, while masses thrown from volcanic vents form mountains over 15,000 feet in height. The streams have cut out deep valleys, and the whole area is very rugged and difficult to traverse.

Like the lower lands to east and west, this country has a dry cool season and a wet summer, and because of its altitude the summer rains are heavy. The water of the northern part of Abyssinia drains to the Nile by the Sobat, the Blue Nile, and the Atbara rivers. The Blue Nile issues from a large lake, Tsana, reported to be “full” of hippopotami.

The native name of the people is Abeshi, which means Mixed, for they are grouped into a number of tribes often hostile to one another. They represent, indeed, different races, Semitic, Hamitic, and Negro, the Hamitic element being the most marked. In spite of the lack of unity among the inhabitants, they have been able to repel invasion because of the difficulty of conquering them in such rugged country. For example, at the end of the nineteenth century the Italians attempted to establish a “Protectorate” over Abyssinia, but the Italian army was defeated, and the Italian rule is limited to the north-eastern district, near the Red Sea, known as Eritrea.

Abyssinia, therefore, remains independent, and the three Powers which have acquired neighbouring territory, Britain, France, and Italy, have undertaken to maintain its independence, to abstain from interference, and to act so that concessions, *i.e.* rights of trade and development, given by the Abyssinian government to any one of them shall not injure the interests of the others. The ruling class among the natives are Christians, their Christianity being a peculiar kind, for the country was converted in the fourth century after Christ, and during

the succeeding centuries the religion has been handed down among the peoples of the region and modified by them apart from the developments which have occurred elsewhere. The Mohammedans attempted, but failed, to impose their religion here, so that the Abyssinian highland has remained like an island of Christendom standing out of the Mohammedanism around it.

The people are both pastoral and agricultural. Because of the elevation, the products are varied, ranging from the date palm, sugar-cane, and cotton to wheat and barley. Cultivation is backward, however, and the only exports of any value are hides and skins, and coffee grown on the lower mountain slopes.

Egypt and the Nile.—Egypt is commonly said to be “the gift of the Nile,” and before the country can be understood, the course of that greatest of African rivers must be described.

The main stream of the Nile, that is, the White Nile, has its source in Lake Victoria on the high plateau of East Africa. From this plateau it flows northward and descends by steps, which cause the Ripon and Murchison Falls, into the almost flat region of the Anglo-Egyptian Sudan. Here it is joined by the Bahr-el-Ghazal from the west and turns eastward in the direction in which this stream flows until it has received the waters of the Sobat from Abyssinia. Then it turns northward again, and at Khartum is joined by the Blue Nile and lower down by the Atbara. From this point it receives no more tributaries, and it pursues its course through a narrow valley with the desert on either side.

Between Khartum and Aswan the course of the Nile is interrupted by a series of six cataracts; the river has cut its valley deeply into the sandstone of which the ground here consists, and has crossed a series of bars of

hard crystalline rock, which it has not been able to wear down to the level of the softer sandstone ; its course is therefore interrupted at these points and navigation is practically impossible.

Below Aswan the Nile winds slowly through its long, narrow flood-plain ; this is seldom more than ten miles wide and is often sharply separated from the desert by cliff-like borders. At Cairo begins the delta ; the river has many distributaries crossing the marshy lands, but most of the water passes through the Rosetta and Damietta branches.

As the people of Egypt depend for their living entirely upon the water which the Nile brings, the way in which this is supplied is of the utmost importance. In the equatorial highland region, the White Nile has its water-supply kept fairly level by the lakes and by the fairly uniform distribution of rainfall throughout the year. The river is at a rather greater height in the summer, but more water is then evaporated in the hot Sudan region, so that there is little difference through the year in the volume of the water brought down by the river before it is joined by the Sobat.

Here, however, is a new factor. The Sobat is flooded by the heavy rains of Abyssinia and its waters raise the level of the White Nile, and even pond up the water of this river *above* the meeting-place. Thus floods actually go *up* the White Nile, and the whole district where the Bahr-el-Ghazal and White Nile join may be flooded in summer. This district is therefore one of marshes, and in these grows vegetation which is sometimes torn up and drifted into a dense mass known as "sudd" or "sadd" ; the sudd accumulates to such an extent that at times it prevents navigation.

Below the Sobat the White Nile rises in autumn, for the water takes time to work down the stream, but the

greatest flood comes down from Abyssinia by the Blue Nile. In the first week of September the Blue Nile brings down about fifteen times as much water as the White Nile, and ponds back this latter stream just as it was ponded back above the Sobat. The water brought by the Blue Nile pours down the valley of the main stream, floods the land on either side, and takes with it a great deal of fertile silt worn from the volcanic soils of the upper basin. The Atbara is similarly flooded, so that the fertility of Egypt is almost entirely due to the water from the summer rainfall and to the worn-away ground of Abyssinia which are transferred to the Nile Valley.

Thus the annual flooding of the Nile has, for thousands of years, brought water and finely divided soil to Egypt, where the crops are planted in the moistened earth when the floods subside, and later are ripened by the hot sun. By such cultivation the ancient civilisation of Egypt was made possible, and ever since that time the people have lived in much the same way, although new crops have been introduced and men have improved their methods of using the water.

The flood waters may, in some years, be exceptionally high and if they are not controlled they may do great damage ; also the land can only be moistened once in the year. But by building a dam across the river it is possible to hold back as much of the water as necessary and so prevent unduly high floods ; also the water thus retained may be let out at a later period, and in this way further supplies of water may be given to the crops.

For this purpose the British have built a huge dam across the Nile at Aswan, where a great quantity of water is held up ; lower down other dams are made so that the water can be let out just as required. Also a system of canals has been made to distribute the water over the land,

and by these means irrigation has been made much more effective.

These works have added greatly to the productivity of Egypt, and the population has greatly increased. In forty years it doubled, and is now about thirteen millions. The kind of cultivation has also changed. For many centuries the people grew foodstuffs for themselves, while "corn in Egypt" attracted their neighbours whose supply failed when local rains were lacking, and so for a long period there was an export of wheat; the people also grew flax from which they obtained linen for clothing. Recently the importance of these older crops has been surpassed by the cultivation of cotton, by far the greater part being sent to England for the mills of Lancashire.

In the upper part of the valley the old "basin" system of an annual flooding is still employed, and cereals and vegetables are produced. In the more productive lower valley, the delta, and the neighbouring depression of the Fayum, the irrigation works give a constant water supply, and there is a great variety of crops. Cereals are grown during the winter and spring (note that the mid-winter temperatures as shown by the isotherms are not much lower than those of summer in Britain); cotton, sugar, rice, maize, millet, and vegetables are grown during the late summer and autumn.

The export trade is largely composed of cotton, cotton seeds (for the oil and the oil cake obtained from them), wheat and other foodstuffs, and tobacco; in return, manufactured goods of all kinds are imported. The chief port for this trade is Alexandria, situated on the west side of the Nile delta, where its harbour is not blocked up by the silt brought down by the river. As the currents of the Mediterranean sweep round in a counter-clockwise direction this silt is taken eastward, and Port Said, whose

existence is necessary at the entrance to the Suez Canal, has to be kept clear by constant dredging.

At the head of the delta is Cairo, the largest city of Egypt, with about three-quarters of a million inhabitants. Railways connect Cairo with the ports, and from it a line goes up the valley to Aswan. There river navigation takes its place, for the first cataract has been circumvented by a short canal and boats can go up as far as Wadi Halfa, on the southern border of Egypt, below the second cataract. From Wadi Halfa to Khartum a railway supercedes the unnavigable river, and this railway is now continued further into the Sudan, but it is not yet linked up with those of Central and South Africa to form the projected "Cape to Cairo" route.

The territory of Egypt extends into the desert area of Sinai and so includes the Suez Canal, which goes from Port Said to Suez at the head of the Gulf of Suez, an extension of the Red Sea. This canal was constructed in 1869, and opened a short route between Europe and Asia, a great gain to the commerce of many countries and of particular importance to Britain, as it provided an easy way to India. Thus the Suez Canal is regarded as an essential link between Britain and India, and the British government has invested many millions of pounds in the company owning it; for this investment it obtains interest derived from the tolls paid by steamers which use the canal.

The Egyptian people are for the most part peasants, known as Fellahin. They are of mixed race, mainly Hamitic, with a negro admixture most noticeable in the south. They are Mohammedans, for they were conquered by the Arab tribes, and as a result came under the rule of the Mohammedan Sultan of Turkey. For many centuries Egypt was a nominal dependency of Turkey, but it was ill-governed, and in 1882 a British

army occupied Egypt, partly because of the British desire to protect the canal and to be able to use the short sea-route to India. Egypt still remained a nominal part of the Turkish Empire, but Britain practically controlled the government and carried out many improvements.

At the time of the Great War Turkey took sides against Britain, and consequently in 1914 the British deposed the nominal ruler of Egypt, declared the country a British Protectorate, and set up a new ruler (the descendant of an earlier one) with the title of Sultan. The Egyptian people resented this ; they claimed that previous British governments had repeatedly stated that they had no intention of annexing Egypt, and had indeed promised to withdraw when the Egyptian government had become good enough and strong enough to guarantee fair dealing to the foreigners who had invested capital and engaged in commerce in the country. There were widespread discontent and riots, and in 1922 the British government recognised Egypt as an independent sovereign state, but British troops are still maintained in order to assure the safety and interests of foreigners and the security of the Suez Canal.

ASIA

ASIA is by far the largest of the continents, for it includes about one-third of the land area of the globe. It has an even larger proportion of the world's population, and this is realised to be a very remarkable fact when one looks at a population map of Asia. Such a map shows that there are few inhabitants in the west, centre, and north of the continent, and that the population is almost entirely confined to the south-eastern regions. In the three great countries, India, China, and Japan, lives nearly one-half of mankind.

Further, this densely peopled south-eastern portion of Asia, often called the Monsoon Lands, is cut off from the remainder by deserts and great mountains. For many centuries it was almost completely isolated from the rest of the world ; civilisations grew up here distinct from those of Europe and Northern Africa, and the great religions of the Monsoon Lands have few followers outside the region.

To understand the reasons for these facts we must consider the relief and the climate of Asia as a whole. In the heart of the continent is the highest part of the Earth's surface, one portion of it, the Pamirs, being called the " Roof of the World." This area is named the Central Highlands in the map of Natural Regions in Fig. 4 (p. 63). To the north and north-east is another great region of mountains and enclosed plateaus, named the Central Ridges and Basins.

These two regions form the core of the continent and they are shut in by very high mountain borders .

consequently they are poorly watered by winds from the sea and for much of the year are very cold. They are scantily inhabited and are a great factor in separating the more fertile surrounding areas from one another. A large part of south-western Asia is also mountainous, especially in the regions named the Iran Plateau and Asia Minor, and Arabia is almost entirely desert. This area is penetrated by the Persian Gulf, the Red Sea, the eastern end of the Mediterranean, the Black Sea, and the south end of the Caspian Sea ; it has therefore been called the " Land of the Five Seas." * Some parts of it are fairly well watered, others are desert ; on the whole its aridity and its mountains make it a barrier between Europe and northern Africa on the one hand and south-eastern Asia on the other.

North-west and north of the Highlands and Ridges are lower regions ; desert in the Aral Region near the Caspian Sea and the Sea of Aral, and cold in the Northern Forests and the Tundra Region. The Steppes between the Aral Region and the Northern Forests are more favourable for movement, but they lead only to the Central Ridges and Basins, and not to the Monsoon Lands (see again Fig. 4). In the north-east there are ridges which are a continuation of the central mountains, and these ridges, together with the inclement climate, hinder movement along the northern forest route from Europe to Eastern Asia.

Taken as a whole, the eastern margin of Asia is a mountain region ; great chains and loops of mountain land almost shut off the continent from the Pacific Ocean. These mountains are continued southward through the East Indies region as far south as New Zealand ; they are continued north-eastward by the Aleutian Islands

* In the " Land of the Five Seas " are sometimes included the adjoining parts of Europe and Africa.

to the western highlands of North and South America. The Pacific is thus almost girdled by mountains which are in the main fold-mountains, formed at the same time as, and in many ways resembling, the system of fold-mountains which extends from the Mediterranean to the Himalayas. On the margins of Eastern Asia the mountains have subsided to a considerable extent, and therefore appear as islands rather than a great highland mass like that which forms the continental core of Asia.

The two most populated countries of the Monsoon Lands are India and China, for they have great, well-watered and fertile plains. These two countries are separated from one another by a series of ridges which extend south-eastward from the Central Highlands into the peninsula of Indo-China.

East of China is the Japanese Empire which includes the peninsula of Korea and the island of Formosa as well as the islands of Japan proper. Although Japan would seem to be even more isolated than China because of the sea between it and the mainland, yet the peninsula of Korea has proved a stepping-stone by which peoples have passed from Northern Asia, while the chains of islands extending from the East Indian Archipelago along the eastern coasts of Asia have enticed other peoples, both as settlers and as traders, to follow this southerly route from the Indian Ocean by the Malay region to Japan.

Yet all the routes to the Monsoon Lands are long and difficult, and also the climate of these lands is so different from that of the northern and western regions of Asia that when invaders have penetrated they reached countries to which they were unaccustomed and usually unsuited.

These invaders have, for the most part, come from semi-arid lands that lie either on the western borders, or between the ridges, of the central mountains. They

were therefore pastoral, nomadic peoples, and it appears that at several times in the past, they found that because of a decrease in the rainfall, their pastures were diminished and they could no longer get sufficient food in their homelands. Then, mounted on their horses, great bands of them pressed out across the highland barriers to seek a living in other regions. They found little difficulty in conquering the agriculturalists of the south-eastern plains whose lives had been spent in peaceful toil, and who lived in families and in villages which had not been organised for fighting into powerful states.

So the invaders of India and China made themselves masters and even established dynasties of emperors in these countries, but they were few in number and had little influence upon the mass of peasants from whom they extracted tribute. In course of time, their power decreased and they were deposed either by a rebellion within the country or by a fresh raid from without. Thus time after time the peoples of India and China have been conquered, but have survived and have retained their peculiar characteristics.

During the last two or three hundred years a new development has taken place ; the nations of Europe have affected this remote and sheltered area. The Russian power advanced across the Siberian plains and threatened Northern China ; the English and French came by sea to the south, to India and Southern China. Now England has acquired the great Indian Empire and France has a considerable part of Indo-China, and yet it is quite possible that these conquests, like those of preceding centuries, will in the course of time pass away, and that India and Indo-China will be again independent of foreign rule.

China has barely managed to retain its independence, but Japan has done more. It has set itself to become

powerful by learning from the western nations, and in a relatively few years has not only kept its own territory but greatly increased it, and it is now regarded as one of the great Powers of the world.

When one compares the people of the different parts of Asia with one another, one realises the great influence which climate has had upon their characteristics and their history ; consequently it is desirable to consider more carefully the differences of climate within the continent.

The Climates of Asia.—The monsoon system of Asia (together with the relief of the land) is the most important factor in determining the climatic conditions. In the summer the temperatures over the land are considerably higher than those over the ocean in corresponding latitudes, as is clearly seen by noting the course of the sea-level isotherms for July. Of course the air temperatures over highlands are lower than those over the lowlands and they may be lower than those *immediately* over the ocean, but we are concerned with the comparative temperatures over land and water *at the same level*. To take an example, the air over a mountainous region of central China, 3,000 feet in elevation, has a July temperature of about 85° according to the sea-level isotherms but an actual temperature of 75° , adopting the rule of 1° less for each 300 feet of elevation. The ocean in the same latitude and south of Japan has a sea-level temperature of less than 80° , and therefore the air on a level with the mountainous region has an actual temperature of less than 70° . Hence the air over the land is warmer than that at the same elevation over the ocean by about 5° .

It is this difference of temperature at corresponding levels that causes the difference of air pressures and

winds. The winds blow into the continental region of low pressure and rise, particularly when they encounter and cross the uplands and highlands. In rising they are cooled and so rain falls, especially on the seaward slopes of the mountains.

This general statement, however, needs very important additions. In the first place, the winds do not blow along the shortest path from a region of higher pressure over the ocean to the lower pressure over the land. Because of the rotation of the Earth, they are turned or deflected to the right of the shortest path in the northern hemisphere, and to the left of it in the southern hemisphere. For example, they do not blow directly from the south into southern India, but cut across this direction to the right, that is, they blow from the south-west; hence most of India has a south-west monsoon wind in summer. (See the map showing winds in July, on p. 214.)

Similarly they do not blow directly from the east into China, but from the south-east, and China has a south-east monsoon wind in summer. As a corresponding deflection occurs everywhere over the continent, the winds as a rule blow inward, but in a slanting and counter-clockwise direction, and as marked on a map they form a kind of whirl around and into the central part of Asia. For example, the winds entering in the Siberian region come from the north-east, *i.e.* from the Arctic Sea; those crossing the region of the Sea of Aral come from the north, *i.e.* from the plains of European Russia and Siberia; those of Mesopotamia and Arabia blow from the north-west, from Asia Minor and Syria; those of North-western India blow from the west, from the lands of Arabia and Persia. These directions should be carefully examined on the map showing winds for July, on p. 214.

Now when it is realised that the water vapour in the

air comes from the oceans, and especially from warm oceans, it will be seen that the amount of water vapour carried in these winds varies greatly, being greatest in India, Indo-China and China, where the winds come from the hot tropical seas, less in the Siberian region, and less still in the south-west of Asia, where the winds blow from land areas. Hence the amount of rainfall varies similarly ; it is greatest in the south-east of the continent, and it is because these regions depend upon the heavy summer rainfall brought by the monsoon winds that they are called the Monsoon Lands. The rainfall is less in the north of the continent, and in summer the south-west receives very little or no rainfall.

It must also be added that so high are some of the mountain barriers of the Central Highlands that little wind crosses them ; the winds of India do not cross the Himalayas, but are turned up the Ganges valley. In the case of the basins of the interior, such as the Tarim Basin and the Gobi Region, there is little rainfall because the water vapour has been precipitated in the marginal areas.

It is a useful exercise to copy upon a relief map the winds as shown on the July pressure and wind map, then to estimate the relative rainfall of the various parts of Asia, and finally to compare this estimate with the summer rainfall as shown in the map in the atlas.

The winter monsoon conditions are almost exactly the opposite. The air above the land (especially in the north) is cooled more than that at corresponding levels over the sea. There is a region of high pressure and descending air over the land, and this air blows out deflected to the right in a slanting and clockwise direction. (See the map of January winds, on p. 215.) Hence the eastern coast of Asia has, on the whole, cold winds from a northerly or north-westerly direction, while India has

north-easterly winds, which do not cross the Himalayas but are formed of air which sinks down from the upper atmosphere over the Ganges and Indus plains. South-west Asia also has north-east winds in parts, but the conditions vary because of the relief of the land and because of the existence of cyclones which penetrate this region from the Mediterranean area. Most of Siberia, with the exception of the Pacific coastal region, has southerly or south-westerly winds.

As these winds are caused by air settling down from high altitudes they contain very little water vapour, and hence on the whole the winter is the dry season for Asia.

There are three great exceptions to this rule of winter drought, for in three regions on the margins of the continent cyclones occur and draw in moist air from the sea. The first region is the northern part of the Land of the Five Seas, where the cyclones from the Mediterranean area occasionally penetrate as far as the Central Highlands; the rain over the coasts of Asia Minor is considerable, and even North-western India and the plains around the Sea of Aral get a little rain. The second region is the south-east of India where cyclones bring some winter rain from the Bay of Bengal. The third region is the coastal part of China and Japan, for cyclones bring rain to China from the Pacific Ocean, and to Japan from the water which is on both sides; consequently the winter rainfall of Japan is quite considerable, especially on the western side where the prevailing winds are from the north-west and therefore cross the Japan Sea before reaching the islands.

Occasionally the summer monsoons do not bring the usual rains, and when the "monsoons fail" the crops fail also; in this way famines and starvation come upon millions of Indian or Chinese people every few years.

In the extreme south of the continent are the islands of Ceylon and the East Indies, to which must be added the southernmost part of the Malay peninsula (again see the map of the Natural Regions of Asia, on p. 63). In the northern summer these lands have southerly winds ; in the northern winter they have northerly winds. Compare the maps on p. 214 and p. 215. At both seasons the winds come from the surrounding tropical ocean and at both seasons there is rain ; hence these lands form a climate region much like that of equatorial Africa, characterised by constant heat and rain.

The atlas rainfall maps for summer and winter should now be compared and the regions of Asia should be grouped into four classes : (1) those with rain at both seasons ; (2) those with heavy or moderate rain mainly in summer ; (3) those with heavy or moderate rain mainly in winter ; (4) those with little or no rain at any season. The regions which have rain at all seasons or when the temperature is high have a great advantage, as heat and moisture together make possible the growing of heavy crops ; those which have rain only during a cool season cannot produce such abundance ; those which have little rain can have only a scanty growth. Consequently the grouping of the regions just suggested gives an idea of their relative productivity and of their ability to support dense, medium, or scanty populations.

Arabia.—The Red Sea occupies a rift valley separating what are essentially two portions of the same desert, for on both sides of the steep cliff-edges of the Red Sea depression stretch regions with similar climate, scenery, and people. As Arabia is so like the Sahara, it need not be separately described, but it should be noted that in the south-west, opposite Abyssinia, there is a plateau, the Yemen, rising to a height of several thousand feet.

Here there is a little rain and consequently some vegetation. On the slopes coffee is grown, still known as Mocha coffee because it was exported from that place, but it is now shipped from Aden. Aden is a British fortified station at the southern extremity of Arabia ; it guards the entrance to the Red Sea and therefore protects the seaway to India. It is also a very useful coaling station for the steamers passing through the Suez Canal, but in summer the intense heat, the dryness of the air, the lack of shade, and the complete absence of vegetation make it a very unpleasant station for the officials and soldiers.

A wide strip on the western side of Arabia forms the kingdom of the Hejaz. This kingdom was formed after the Great War when the Arabs threw off the rule of the Turks. Before the war the Turkish Empire in Asia included Arabia, Syria, and Mesopotamia, all of which had very few Turkish inhabitants but were at least nominally governed from Constantinople. The Turks did little more than collect taxes in these distant parts, and many of the Arab tribes were practically independent.

The Hejaz district is important because in it are the holy cities, Mecca and Medina. A large proportion of the inhabitants of North Africa, and of Central, Western, and even Southern Asia, are Mohammedans, and from all these regions pilgrims go to the holy cities at the time of the great annual festival, for by so doing they hope to obtain eternal salvation. Many thousands of pilgrims attend, coming by sea, or in great caravans, or (in recent years) from Syria by railway to Medina ; they often suffer great hardships on the journey, which may take them months and exhaust the scanty savings of a lifetime. These pilgrimages do much to bind together the Mohammedans of all countries, among whom there is a common feeling that has often been aroused by a conflict with Christian states.

Besides having been important as the cradle of the Mohammedan religion, Arabia has influenced other regions by repeated, and indeed almost constant, emigration of its people. The poor land cannot support an increase in the population, and so the hardy and warlike Arabs have raided the cultivated lands around them and settled in them in large numbers ; hence Syria and Mesopotamia are now mainly inhabited by Arabs. Also they have gone in smaller numbers to more distant regions, both into Africa and also along the southern shores of Asia.

Syria.—This is a “Mediterranean” region, for it lies between the desert and the eastern shores of that sea ; most of the region receives sufficient rain in winter to give it the characteristic Mediterranean type of vegetation, and the greater number of its inhabitants, whether of Arab or Jewish descent, belong to the Mediterranean race.

The country consists of four parallel strips running from north to south behind the coast. First there is the coastal plain, very narrow in the north and rather wider in Palestine, that is, the southern part of Syria ; here are grown the typical fruits of the region and Jaffa oranges from Palestine are famous.

The next strip is highland ; this rises in the central portion to the Lebanon Mountains, noted in the past for their cedar trees but now more important because of the mulberry trees which feed silkworms. A great deal of silk is produced here and exported from Beirut, whence ships take most of it to France for manufacture.

In Palestine the highland region forms the Plateau of Judea, the real home of the Jews. These people lived partly by keeping sheep on the plateau, partly by growing corn and fruits in the lower lands. In early times the

chief inhabited regions of this part of the world were Egypt and Mesopotamia, where the peoples worshipped a number of gods. The Jews derived ideas from these peoples, but developed them in a way of their own, for they lived in rather an isolated manner on the steep-sided plateau ; here they evolved the idea of one God which was the basis of the Jewish faith. In Palestine, too, the Christian religion had its origin, whence it has spread throughout the world.

Jerusalem, a city of about 70,000 people, situated high on the plateau, is therefore the holy city both of Jews and Christians, and the Mohammedans also revere it. Like Mecca and Medina, it is annually visited by many thousands of people, but most of the visitors are Christians, some of them poor peasants from Eastern Europe, others well-to-do people from Western Europe and America.

The third strip of Syria is a lower region lying to the east of the highland belt ; it varies in elevation as the altitude of the highland belt varies. Thus behind Lebanon it is relatively high and is indeed like a mountain valley separating the Lebanon from the Anti-Lebanon which forms the highest part of the fourth belt. South of this portion all the belts are lower, and the third one sinks rapidly and becomes the deep trench in which are the River Jordan, the Sea of Galilee, and the Dead Sea. The upper course of the Jordan, just above the Sea of Galilee, is so rapid that it is now utilised to obtain water-power.

The southern part of the long depression is another rift valley, and by the Judean plateau its walls are almost vertical and form almost unscalable cliffs ; here the plateau top is over two thousand feet above sea-level, while the level of the Dead Sea is about 1200 feet below that of the Mediterranean. These edges of the Rift Valley have done much to protect the Judean shepherds and

cultivators from raids by the nomadic tribes of the desert beyond. The Dead Sea has no outlet, for in the deep trench the heat is so great that evaporation removes even more water than now enters it ; indeed the Dead Sea is smaller than it used to be, and this is considered one proof of the gradual drying up, or " desiccation," of this part of the world. Of course, the lake is salt, and its name is due to the fact that fish brought down by the Jordan die in its waters.

The fourth strip is again rather high and on the whole forms the edge of the desert ; it is just on the margin of cultivation, and only in the north of Syria is there sufficient rain to make the " Mediterranean " type of country extend beyond it to the neighbourhood of the Euphrates River.

Just behind Anti-Lebanon, and watered by the streams flowing from the mountains, is the oasis city of Damascus. The city is surrounded by many square miles of irrigated gardens and orchards, and has therefore been compared to a pearl set in emeralds. Damascus is a great city of about 300,000 inhabitants, it is connected by railway with Beirut and is a centre of caravan trade.

Since the Great War, Northern Syria has been allotted by a mandate to France, for the French people have invested much money and engage in trade in the region. Palestine has similarly been mandated to Britain, and Britain has undertaken to help in establishing there a " National Home for the Jewish People." To aid Jews from all parts of the world to settle in Palestine, there is a " World Zionist Organisation," and with its help the new-comers are developing the resources of the country, but by so doing they compete with the Arab fellahin, who number 600,000 out of the total population of 800,000 people. As there are other sources of disagreement, especially religious differences, between the Mohammedans, the Jews and the Christians, the British Administration

has a difficult task in establishing a common government in which all the peoples co-operate.



FIG. 4.—Natural Regions of Asia.

† Palestine is bounded on the east by the River Jordan and the Dead Sea; beyond it on the margin of the desert is the new independent Arab state of Trans-Jordan.

Asia Minor.—Asia Minor, sometimes called Anatolia, is a plateau which rises steeply from the Black Sea on the north, and from the Mediterranean Sea on the south, while most of the interior is lower than the coastal ranges. On the east it rises to the Armenian Highlands where Mount Ararat is nearly 17,000 feet in height ; on the west it sinks gradually so that the valleys of the westward flowing rivers sink to lowland plains by the Ægean Sea.

Therefore most of the trade of the country passes up these valleys, and in the centre of the western coast is Smyrna, the chief port and largest town of Asia Minor. Also the western region is comparatively well watered and is fertile ; here are grown the famous Smyrna figs, as well as other Mediterranean products.

The central portion of Asia Minor is so enclosed by mountains that it is semi-arid ; cultivation is carried on where streams from the heights give water for irrigation, but large parts of the country are merely poor pasture land. Hence many of the people are pastoral and nomadic, keeping herds of sheep and goats ; the “Angora” goats are so named from a town on this plateau. From the hair of these goats and the wool of the sheep are made the “oriental” rugs and carpets exported from Smyrna, but usually woven in the mud-houses of the cultivators or the goats'-hair tents of the nomads.

The plateau is the home of the Turkish peasantry, a hard-working, hospitable people, who have nevertheless been very cruel to other peoples living among them, especially to the Greeks and Armenians. The Greeks have settled in the west as traders and agriculturalists ; they have prospered and have often acquired the lands and houses of the Turks in this part. This has caused them to be generally hated, while as Christians

they are despised and considered to be little better than animals by the Mohammedan Turks.

There were so many Greeks by the coasts of the *Ægean Sea*, that after the Great War the Allied Nations gave a large district around Smyrna into Greek rule ; the Turks of Asia Minor would not agree to this although the Turkish government at Constantinople had accepted it. Therefore the Asiatic Turks formed an army and set up a local government at Angora ; they defeated the Greeks, obtained power over the Constantinople government, and finally made a new treaty with the Allied Nations by which all Asia Minor remained Turkish, and the Adrianople Basin in Europe was also restored to the Turks from Greek occupation. At the same time an interchange of " minority " populations was agreed to ; the Greeks who had lived in Asia Minor were to be sent to Greece, and the Turks who had lived in Macedonia were to be settled in Asia Minor. It is hoped that this organised migration may solve one of the problems which have made " The Near East " a region of conflict for many centuries.

The highlands at the north-eastern side of Asia Minor are the home of the Armenians. Like the Greeks, these people are clever traders and have spread throughout south-western Asia ; they are also Christians and greatly disliked by the Turks. They have therefore suffered repeated massacres, so that their numbers have been greatly reduced and they have been driven from a great part of their lands.

South of the Armenian Highland is a region known as Kurdistan, which extends into Persian territory on the east. This is the home of the Kurds, who are nomadic tribes, Mohammedan in religion, and usually very hostile to the Armenians. The Kurds have often raided the Armenians and the Turks have not restrained them.

Indeed, the conflicts between Kurds and Armenians are taken advantage of by the Turks, who claim to rule both peoples. The Allied Nations tried to ensure the good government of these highlands, but the Turks would not accept any interference with their sovereignty of the region, and the problem of the minorities in the Turkish dominions is still unsolved.

The Caucasian Republics.—Between the Armenian Highland and the Caucasus Mountains are the valleys of two rivers “back to back,” one leading to the Black Sea, and the other to the Caspian Sea. These valleys are fertile and form a most important part of the Caucasian Republics which split off from the Russian Empire during the Great War. On the western side is Georgia; on the eastern side is Azerbaijan. One of the chief resources of Azerbaijan is the possession of important oil-fields close to Baku at the eastern end of the Caucasus Range. The oil is obtained from numerous wells in the region and conveyed to great reservoirs. From these some of it is pumped into ships which convey it across the Caspian, either to Eastern Europe by the Volga or to Western Asia. A great deal of the oil is pumped along a huge pipe-line which goes up the valley and across the water-parting to the Black Sea port of Batum in Georgia, where it is shipped to many destinations. The pipe-line runs by the side of the railway which connects the two ports, using petroleum for its fuel.

Mesopotamia.—Mesopotamia means “between the rivers”; these rivers are the Euphrates and the Tigris which have their sources in the mountains of Armenia and Kurdistan, and flow south-eastward to the Persian Gulf. These streams have a marked time of flood, which comes earlier in the year than that of the Nile, for

it is due partly to the winter rain and snow on the highlands, and especially to the rapid melting of the snow in spring and early summer. At such times the streams bring down much alluvium, and the lower part of Mesopotamia is really the delta of the rivers.

The climate of the region is shown by the temperature and rainfall graphs for Bagdad in Fig. 5. It is

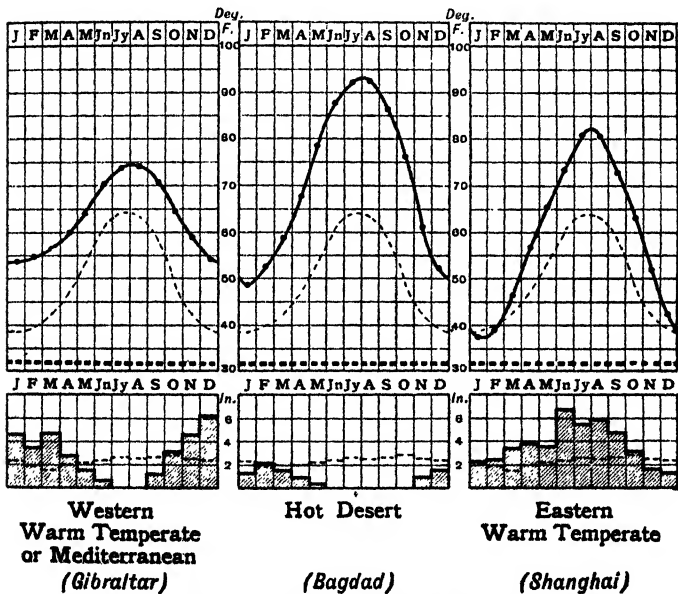


FIG. 5.—Climate Types in Eurasia, about Lat. 35° N.

clear that cultivation must depend on an artificial water supply, and in ancient times the waters of the rivers were used for irrigating great stretches of the lowlands. The plains were then densely populated; powerful and civilised states were formed, and there were great cities like Nineveh by the Tigris where now is Mosul, and Babylon by the Euphrates south of Bagdad. But the

states were overthrown by invasions, the good government of the country disappeared, and the great irrigation works which controlled the floods fell into disrepair. The waters swept over the lands, destroyed crops, houses, and people, and the great cities now remain only as ruins.

Under the Turks the government was bad, and the Arabs who are the chief people of the region are few in number as compared with the peoples of past times, and for the most part are very poor. Bagdad, near the head of the flood-plain, is the chief city and the centre of trade of the region ; it is connected both by river navigation and by railway with Basra, the port of the delta. There are great plantations of date palms around Basra, and from this town thousands of tons of dates are sent each year to Europe and America.

During the Great War Mesopotamia was occupied by British troops, for a great deal of oil needed for the navy and for motor transport was got from the Persian highland region adjoining the delta, and oil is also obtained from the Kurdistan area near Mosul. The communications of the region were then improved, irrigation works were begun, and much wheat was grown. After the war, a mandate for Lower Mesopotamia, known as Iraq, was given to Britain, and under this mandate the British set up a local government under an Arab king. If this government can secure peace, British engineers using capital lent from Britain and other countries may restore prosperity to the region and make it yield much produce for export.

The " Bagdad railway " is intended to form a new link in the chain of communications between Europe and Southern Asia. It begins opposite Constantinople in Asia Minor, and proceeds diagonally across the plateau but it avoids the arid centre. After leaving the plateau,

it crosses from the Mediterranean region to the Euphrates by Aleppo, an ancient centre of the caravan trade, whence another line leads southward through Syria to Arabia. From Aleppo the Bagdad line skirts the highlands * and goes down the Tigris by Bagdad to Basra. Thus a relatively quick route from Europe to the Persian Gulf is obtained, and thence traffic continues by ship to India and the Far East.

The Iranian Plateau.—This great plateau is so called from the word Iran, the name which the Persians give to their country. It also includes, however, Baluchistan, which forms a portion of the Indian Empire, and the greater part of Afghanistan.

Like many other plateau regions it is somewhat basin-shaped, for it is bordered by still higher mountains, known by different names in different parts ; overlooking the southern end of the Caspian Sea are the Elburz mountains, which attain a height of 18,000 feet. On the north-eastern borders, in Afghanistan, the mountains rise into the Hindu Kush ; in the map of the Natural Regions of Asia these are included in the region called the Central Highlands.

In the summer the Iranian Plateau has dry land winds ; in the winter only the high margins receive an appreciable precipitation. Consequently the interior is practically rainless, much of it is desert and the rest a poor scrub-land ; only where streams bring water from the highland borders is there fertility.

Because the interior is shut off from the moderating influence of the sea it tends to have an extreme climate as regards temperature. This tendency is increased by the absence of cloud and by the rarity of the air in high altitudes, for the sun scorches the ground by day and the

* The part of the line near Mosul is not yet completed.

ground cools rapidly at night ; similarly the annual changes of temperature are very marked.

The climate is therefore an unpleasant one, and the only desirable regions are the oasis-like irrigated districts where water, shade, and the sight of flowers and fruits make life much easier. Naturally, the population is scanty, a considerable proportion being nomadic herdsmen ; as on the plateau of Asia Minor, the people make rugs and carpets, and those from Persia are often beautifully coloured. The most populated region is the better-watered north-west, and in this part are the largest towns, including Teheran, the capital of Persia and residence of the Shah. This city has about a quarter of a million inhabitants ; no census of Persia has been taken and its population is estimated at between eight and ten millions. The Persian oil-fields of the mountain region on the borders of Mesopotamia and the Persian Gulf have become important in recent years.

In the eastern part of the interior is a relatively low region, Seistan, to which drain a number of rivers from the heights of Afghanistan. Here the waters spread out into a shallow lake, and are the means of livelihood of many people, both permanent residents and also temporary settlers who leave their own lands when their water supply fails. As the border between Afghanistan and Persia runs through this region, many disputes have arisen between the people of the two countries as to the possession of land or the right to use the precious water.

The people of the plateau are all Mohammedans and they all belong to the Mediterranean race. They are not all alike, however, for there has been much mixture with other peoples in certain parts, and their ways of life are different. Hence there is a marked distinction between the Persians, who in many ways resemble Europeans, and the Afghans, who are much darker in

appearance and in habits are very warlike, often raiding the settlers in the neighbouring countries to add by plunder to the scanty resources of their highland home. The Afghans have had several struggles with the British because of their raids upon north-western India. Yet the British have not objected to the independence of Afghanistan, because this difficult country, inhabited by its fierce mountaineers, has formed a useful "buffer state" between India and the Russian Empire which extended into the mountain region on the north-west and seemed to threaten India. Afghanistan has a population of about six million people; its ruler, known as the Amir, has his capital at Kabul, a city of 150,000 inhabitants, situated close to the Indian frontier.

The Aral Region.—For the reasons explained above, this region is almost rainless throughout the year. As it lies further from the equator than the desert regions hitherto considered, its summer heat is not very great while its position in the heart of a great continent gives it a distinctly cold winter. These conditions are shown by the graphs in Fig. 6 (p. 72), which show how much greater is the range of temperature in this region as compared with that of Britain. Notice the period for which the temperature is below freezing-point, shown by the heavy broken line. The lack of rainfall is clearly apparent, and the region is of course largely desert or semi-desert; except for some oases of considerable size, it is as little productive as the similar regions already described.

Several cities owe their existence to the water brought down from the bordering mountains, and their importance has been greatly increased since the Russians built the Trans-Caspian railway from the Caspian shores (where steamers connected it with European railroads) through the oasis of Merv to the greater cities of Turkestan, the

region east of the Sea of Aral. More recently another line has been built to connect European Russia with this region ; it runs from Samara on the Volga, north of the Sea of Aral, and up the valley of the Syr Daria to the margin of the highlands of Russian Turkestan.

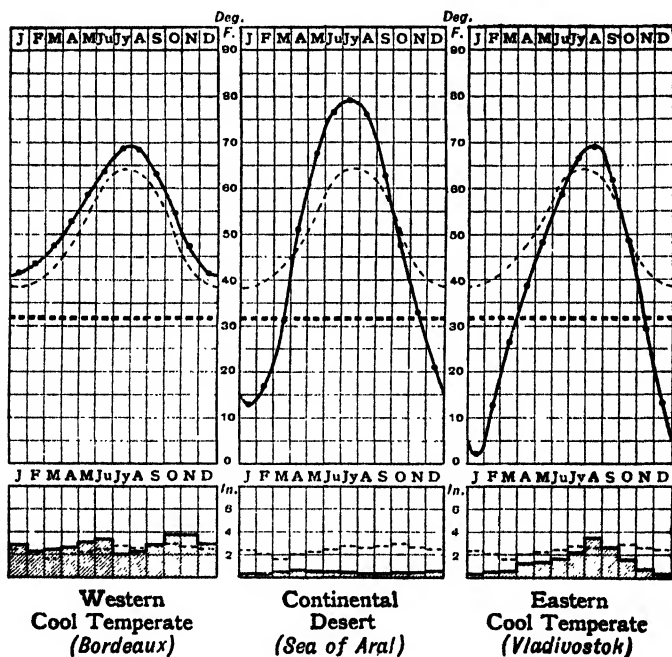


FIG. 6.—Climate Types in Eurasia, about Lat. 45° N.

Here the cultivators produce not only food for their own needs, but much silk and still greater quantities of cotton which are exported by the railway. The towns, such as Bokhara, Samarkand, and Tashkent, are unlike other oases in having railway-stations, barracks for the Russian soldiers, and wide streets of large Russian shops and houses as well as the narrow streets of mud huts that

remain in the older parts of the towns. Since the Russians came, many of the nomadic people have taken to cultivation and the usual raids of nomads upon the agriculturalists have been stopped.

The people of Turkestan are Mohammedans, like those of the other arid and semi-arid regions of Asia. They are akin to the Turks in race, for they are Turkomans and belong to one group of that branch of mankind known as Mongolians.

The Mongolians differ in appearance from the European races in several respects ; their hair is straight or lank instead of wavy, their skin has usually a yellowish tint, and their eyes appear to be narrow or almond-shaped, and to be set obliquely in the face. These characteristics are most clearly seen in the Chinese, who belong to the Southern Mongolian group of people. The Northern Mongolian group is formed of most of the Asiatic people who live north of the Iranian Plateau and the Central Highlands, that is to say, in the Turkestan region, in Siberia, and in the Central Ridges and Basins. This last-named region includes Mongolia itself, whence it is believed that the Mongolian peoples spread out into the other lands.

During many centuries Asiatic peoples and European peoples have inter-married in Western Asia and Eastern Europe, with the result that in those regions their characteristics have become blended, and the western Asiatics do not show the "Mongolian eye" and the yellow skin colour as clearly as the Chinese ; the Turks, for example, look much like Europeans.

The Siberian Steppe-Land.—In the northern part of the Aral region, the country is better watered and passes gradually into the Siberian steppe-land. On this steppe, the winters are colder, the summers not so hot, and

the rain comes mostly in the summer-time. The climatic conditions are similar to those in the Canadian Temperate Grassland region, and may therefore be realised by examining the temperature and rainfall graphs for Regina given in Fig. 9 (p. 156). The summer rain is sufficient to allow grass to grow, but this disappears during the cold winter. Because the heat and the water-supply during the growing season are both much less than those of the tropical regions of summer rain, the grasses do not grow so luxuriantly. The steppes are therefore covered with short grasses like those which grow in Britain, but drier and more hardy, with narrower and stiffer leaves than the ones we usually see. With the grasses are other small plants ; many of these grow from bulbs which remain in the ground during the long, cold winter, and in the spring grow rapidly and have brilliant flowers. At this season the steppe looks bright and pleasant, but as the heat of the summer increases the flowers disappear and even the grass wilts ; in the later summer only the stalks remain on the ground, and the level landscapes appear dreary and monotonous. In autumn the moderate temperature and rainfall allow some plants to have a short flowering season, but this is quickly followed by the winter during which the ground is covered with snow. The temperate grasslands are therefore quite different from the tropical grasslands in appearance, and the natural vegetation provides less food for grazing animals.

At the present time there are no longer wandering herds of wild animals in the temperate grasslands ; either there are domesticated flocks and herds, or the ground has been cultivated to grow crops, including wheat, barley, oats, and hay.

The southern part of the Siberian steppe-land is still largely pastoral, and here the people are the Kirghiz and " Tartar " tribes, who are akin to the Turkomans

further south ; this poorer part of the grassland region is named the Kirghiz Steppe, after its inhabitants. The people of this steppe are semi-nomadic, living during the cold winter in houses made of mud and wood, while in the summer they move from place to place with their horses, sheep, and cattle, pitching their tents at convenient resting-places.

The better-watered northern part is crossed by the Siberian (sometimes called the Trans-Siberian) railway, which connects European Russia with the Pacific port Vladivostok. On either side of this railway the grassland has been occupied by Russian peasants, who cultivate the ground and send away, by means of the railway, a small surplus of the wheat they grow and considerable quantities of butter, together with meat, hides, and wool, from the animals which they rear on their farms.

The Northern Forest Region.—This region is a vast one, for it extends across the whole of Siberia, from Central Europe on the west to the Sea of Okhotsk and the Bering Sea on the east. At midsummer the temperatures are not greatly different from those of Britain (see the graph for Lake Athabasca in the similar region in Canada, shown in Fig. 9, p. 156). The summer, however, is very short and the winters are very long and very severe, the mean temperature being below freezing point for several months. Indeed, near Verkhoyansk, in the north-eastern part of this Siberian region, is found the "cold pole," *i.e.* the place with the greatest cold of any part of the world, for the Arctic region to the north of it has its severity slightly modified by the water of the Arctic Sea. At this cold pole, the mean January temperature is more than 60° below freezing point. The climate is therefore very extreme ; while at Lake Athabasca the annual range is over 70° , at Verkhoyansk it is nearly 120° .

This extreme range is partly due to the absence of moderating wind from oceans, and it is also partly due to the latitude, for in summer the sun is shining (though not very high in the sky) for the greater part of the twenty-four hours ; but in winter it appears only for an hour or two at mid-day, and is then but a few degrees above the horizon.

How the warm sea winds may make a climate equable is seen by comparing the temperature graph for a continental station, such as the Sea of Aral, with one in the same latitude but with sea-winds in the winter, such as Bordeaux ; see Fig. 6 (p. 72).

How latitude affects the annual range may be seen by comparing two places which, except for their latitude, have similar conditions ; *e.g.* in Figs. 5 and 6 (pp. 67 and 72) it is shown that Shanghai has an annual range of 45° , and Vladivostok, also on the east coast and with similar winds but about 10° farther from the equator, has an annual range of more than 65° . The equability of temperature in the Cameroon region, close to the equator (Fig. 2, p. 19), should be recalled in this connection.

There is a moderate summer rainfall through the forest region, and in winter the ground is covered with snow although the precipitation is not great, for the amount of water vapour which condenses to one inch of rain forms nearly one foot of snow. Moreover, this snow does not melt during the winter but accumulates until the spring, and then quickly melts and floods the rivers. For example, the precipitation graph for Lake Athabasca (see Fig. 9 on p. 156) should be read by noting the months when the temperature is below freezing point (from mid-October till late in April), and for that period reading a foot of snow instead of an inch of rain. The idea of the snowfall thus gained, should be applied to the Siberian, as well as to the Canadian, region.

The forest is totally unlike that which grows in the great heat and rain of the equatorial belt. The trees are mainly coniferous, with narrow, needle-shaped leaves, the chief kinds being pines, firs, and larches, with some broader-leaved trees such as birches and aspens. The older branches die off as the upper ones form, so that there is a crown of leafy branches above and only the slender trunks below; therefore although the forest is dark and gloomy it is open, and there is no great mass of vegetation. The trees grow very slowly for they have little heat and rain. Transpiration through the needle-shaped leaves is slight, and consequently the trees do not suffer when the water supply is scanty. The trunks store food in their tissues, and this aids the trees in living during the long winter when the ground is frozen and no food-bearing water can be obtained through the roots.

Although the Canadian and Siberian coniferous forests are generally alike, particular areas have their special characteristics. In the "taiga," as the Siberian forest is called, there are lighter parts formed of pine trees where the soil is dry and sandy, darker parts formed of bigger spruce firs where the ground is clayey and wetter, and swampy districts where rushes and reeds, or mossy bogs, are found. In the colder and drier northern margin the trees are fewer, and in some cases they become stunted and gnarled, as though bending to the ground for shelter against the piercing winds.

The leaves, nuts, and roots of the trees, and the berries of the bushes that are found in some parts, form the food of the herbivorous animals, including deer and bears; there are also many of the rodent or gnawing animals, among which squirrels, beavers, and rats are grouped. Upon the herbivorous animals live the carnivorous ones, wolves, foxes, martens, lynxes, badgers, weasels, and stoats or ermines. These animals are protected against

the cold by thick coats, and their valuable furs are sought by hunters and trappers who form the main part of the very scanty population in the northern parts of the forest where cultivation is almost impossible.

Near the Siberian railway there are farm clearings, where the hardier cereals, such as rye and oats, and vegetables are grown, while at the stations are small trading settlements, but even in the railway belt there are not many people. One reason for the lack of development is the poor means of communication and transport. For example, the timber is valuable, but it would be too costly to send it long distances by railway to Europe or the Pacific coast. Rivers are the cheapest means of transporting it, but although there are three very great rivers flowing through the belt, the Ob, Yenesei, and Lena, they lead northward to the Arctic Sea and not to regions where the timber is needed.

Yet although the Ob, Yenesei, and Lena are of little value for timber traffic, they aid travelling and the transport of lighter goods, for they have tributaries which are longer than almost any European river, and flow in an east-west direction. As some of these tributaries rise not far from others, it is possible to go long distances by water, then to cross the water-parting carrying light weights, and then once more to take to a river; in this way the forest was penetrated before the railway was built, and to-day steamers are used on the rivers. This traffic can be carried on only during the summer; for many months the streams are frozen and sledges take the place of boats.

Western Siberia is a flat lowland, but in the centre the land gradually rises, and on the south-eastern and eastern margins there are highlands; indeed, the region is partially shut off from the Pacific Ocean by the Stanovoi and other mountains. Partially enclosing the Sea of

Okhotsk is the Kamchatka Peninsula, a long highland ridge rising steeply from the sea.

Because of the long winter during which the coast is ice-bound there are no great ports in eastern Siberia ; the Siberian railway leaves the coniferous forest belt near Lake Baikal and turns south-eastward to Vladivostok, far to the south of this region.

The highlands of the southern and south-eastern margins have large deposits of gold, silver, copper, iron, and other minerals. The gold was one of the attractions which led the Russians to occupy this region, and convicts used to be sent from Europe to work in the mines, but the mineral deposits are as yet little developed.

There are few towns of any size in Siberia ; the largest are Tomsk on a tributary of the Ob and near the southern border of the forest in western Siberia, and Irkutsk on a tributary of the Yenisei and on the southern margin of eastern Siberia. Tomsk is connected with the Siberian railway by a short branch line, and Irkutsk is on the main line where it bends southward round the southern end of Lake Baikal. Irkutsk has long been a centre of caravan trade, where the products of the mines and forests of Siberia were exchanged for cotton, tea, and other commodities from the warmer lands to the south ; these caravans still carry on their trade and the railway has added greatly to the traffic.

The Asiatic Tundra.—The coastal lowlands of the Arctic Sea and most of Siberia within the Arctic Circle form the tundra of Asia. This region is a desolate, wind-swept expanse of low or rolling country, where the winters are so severe and long and the summers so cool and short that very little vegetation can live. The ground is always frozen, except for a thin surface layer which thaws for a short period. For the greater part of the year ice and snow

cover the ground ; when these melt in the early summer much of the country is flooded, and consequently there remains a very short period during which plants can grow. There are evergreen bushes, such as the cranberry and bilberry, which give a little food for birds and animals ; and there are wide areas partially covered with mosses and lichens on which the reindeer and other animals feed. On the better-drained slopes, grasses and flowering plants may bloom brightly for a short time ; on the ill-drained lower grounds there are marshes with sedges and cotton-grass. Most of the animal life is migratory, advancing into the tundra in the summer and retreating to the shelter of the forest in the winter.

The few inhabitants of the region, belonging to such Mongolian tribes as the Samoyeds and Yakuts, are nomadic. Some of them possess herds of reindeer which live on the poor pasture of the tundra, even scraping away the snow to feed on the mosses and lichens beneath. The reindeer provide milk and draw the sledges for their masters ; occasionally the people may eat their flesh, but the animals are too valuable for this to be a normal occurrence. Hunting, bird-catching, and berry-collecting in the summer, and fishing in the rivers and sea when the ice melts or can be broken, give a scanty livelihood to other tribes, which move southwards in the depth of the winter, following the animals whose skins and flesh are so valuable in this inclement region.

The Central Highlands.—Some parts of central Asia are so high that the climate is similar to that of the far north and the “ Alpine ” type of natural vegetation is much like that of the tundra. The western part of the Central Highlands is formed of a “ knot ” of mountain systems which here meet : the Hindu Kush extend to the south-west, the Himalaya Ranges to the south-east, and

the Kwen Lun Mountains to the east, and the ridges of the Pamir Plateau to the north-west. Large areas are higher than the highest peak in Europe (over 15,000 feet) and these parts are uninhabited in winter, while in summer nomadic tribes bring their animals to pasture on the Alpine meadows.

Between the several ranges which form the Himalaya Mountains, on the south, and the Kwen Lun Mountains, on the north, is the great plateau of Tibet, over 12,000 feet above sea-level. The people can have their homes only in the river valleys, where they grow barley and vegetables and make their villages and small towns of brick and mud, but in summer they take the animals to the plateau lands and live in tents. They keep sheep, goats, ponies, and, most important of all, yaks. These animals are rather like buffaloes but they have a hump and are covered with very long, thick hair. They can withstand the cold and are the chief means of transport over the high passes which separate Tibet from the rest of the world. The people use the hair of the yak for their tents, they drink and make butter from the milk, they eat its flesh; this animal is therefore almost as important in the highlands as the reindeer is in the tundra.

Three of the great rivers of India, the Indus, Sutlej, and the Bramaputra, have their upper courses in the Tibetan plateau and break through the Himalayan chain in great gorges, unequalled elsewhere in the world; nobody has yet passed from India through that of the Bramaputra to reach the Tibetan part of the river where it is known as the San-po. The greatest rivers of Indo-China and China also have their sources in Tibet, and the most-used route into the country goes from China through the upper valley of the Yang-tse-kiang. By this route the Chinese send tea, cotton, sugar and other goods in exchange for the hides and skins of the animals, for

rhubarb which the Tibetans grow in the valleys, and for salt gathered in the inland drainage areas of the interior.

The people of Tibet belong, like the Chinese, to the southern group of Mongolians, and they are Buddhists in religion. This religion was founded by an Indian prince who lived almost 600 years before Christ, and was called Buddha. Not many of the people of India are now Buddhists, but the religion has spread through all the remaining countries of south-eastern Asia, and the Buddhists regard Lhasa, the capital of Tibet, as their holy city. They make pilgrimages to Lhasa, and in this city is the palace of the Chief Priest, or Dalai Lama, as he is called.

The teaching of Buddha was simple and pure, but the religion has changed and it is not now everywhere of the same kind. Buddhists generally believe that when people die their souls pass into the bodies of new-born babies or of animals, and so men live many lives. If men are bad, their souls pass into the lower animals, if they are good, they live again as men ; the greatest reward of virtue is that the soul ceases its wanderings and is released from contamination in any body. The Buddhists are taught kindness to men and beasts, and a strict observance of their religion forbids them to take the life of any living creature. But many Buddhists do kill animals for food, and in Tibet the Buddhist faith has become very corrupt.

Tibet is nominally a dependency of China, but the government of this latter country can scarcely maintain itself, much less impose its rule upon a distant and isolated region. In practice Tibet is more controlled by Britain, for, like Afghanistan, it has been regarded as a buffer-state between India and Russia. The Tibetans held aloof from Europeans, hindered trade between India and Tibet, and refused to admit foreigners to Lhasa, long

called the Mysterious City, but at the beginning of the present century, a British military expedition forced its way into the country and into the capital. As one result of the expedition, "the mystery and the charm of the unknown have disappeared, leaving in their place a knowledge of the filth of the city and the ignorance of the people." As another result, the Tibetans were forced to sign a treaty with Britain by which trade with India was to be facilitated, the British were to receive an indemnity to cover the cost of the expedition, and no Tibetan territory was to be sold or leased to any foreign Power, nor was any foreign Power to manage or interfere with Tibetan public works without British consent.

The Central Ridges and Basins.—This great region lies north and north-east of the Central Highlands, but nevertheless has not such a severe climate, for its average elevation is considerably lower.

On the whole, it is bounded by mountains or high edges, with great basins in the interior. This structure is particularly marked in the south-west where the Tarim Basin has the Kwen Lun Mountains on the south and the Tian Shan on the north. Thus enclosed, the basin receives practically no rain. The central part is a sandy desert, but near the highland borders is a strip of vegetation fed by the water which comes down from the mountains. Here there are oasis-settlements, and along the fertile strip is a caravan route connecting China with the western part of Asia. There are several such caravan routes just under the mountain ranges of Central Asia, and at certain points on these routes trading centres have grown up. For example, in the Tarim Basin are a few quite large towns, such as Khotan, close to the Kwen Lun range, and Kashgar, at the western exit of the Basin.

Most of the water from the highlands is used up or evaporated in the desert, but the remainder forms the Tarim River which runs eastward till it flows into the great lake Lob (or Lop) Nor. This is a salt lake, and round it are reedy swamps and areas of hard, salt desert, which show that in past times the lake was greater than it is to-day.

The Tarim Basin is under the suzerainty of China and it is sometimes called Chinese Turkestan. It forms part of the Chinese dominion named Sinkiang, which extends across the Tian Shan mountains to include part of a relatively low area between these heights and the Altai Mountains.

The position of this low region is shown on the map of the natural regions on p. 63, where a tongue of the Steppe lands region leads up into that of the Central Ridges and Basins; it forms the easiest route from western Europe and western Asia into Mongolia and China. By this road many invaders have penetrated to China, and the entrance to it is known as the Jungarian, or Zungarian, Gate.

East of the Tarim Basin and the Jungarian Lowland is the great region of Mongolia. The Altai and other ranges bound Mongolia on the north-west, on the south are the Nan Shan, and on the east are the Khingan Mountains. These last are not raised above the Mongolian plateau as greatly as the other mountains; they form rather an escarpment or steep edge where the plateau overlooks the lowland of Manchuria. The central part of Mongolia is occupied by the Gobi or Shamo desert; round the margins are poor steppe lands with nomadic herdsmen, and where the streams come down from the mountains there are small settlements of agriculturalists. The climate is arid and there are great extremes of temperature.

The natural resources of the region are small, and Mongolian tribes have again and again migrated to find a living in lower and better-watered areas. Thus some thousands of years ago they reached China, probably by the oasis-dotted route which skirts the northern edge of the Nan Shan. Thus they penetrated the valley of the Wei-ho tributary of the great Chinese river, the Hwang-ho, whose upper course is in the Mongolian plateau. Mongolia is now a scantily-populated dependency of China.

India.—The Indian Empire includes the whole of three natural regions, viz. the Indus Plain, the Ganges Basin, and the Deccan Plateau, as well as a part of the Himalayan Mountain area on the north, the Baluchistan part of the Iranian Plateau on the west, and the Burmese part of Indo-China on the east.

The Indus Plain.—This region receives very little rain, for the reasons given in a preceding section, but much water is brought down from the Himalaya Mountains by many streams which unite to form five great rivers, the Indus, and its four tributaries, Jhelum, Chenab, Ravi, and Sutlej. Hence the upper part of the Indus Plain is called the Punjab, *i.e.* the land of the five rivers. This country is irrigated by an extensive system of canals leading from the rivers, and grows great quantities of wheat as well as other crops. Much less irrigation is carried out by the lower course of the Indus, and east of it lies the Indian Desert or Thar.

The Ganges Basin.—This region may be taken to include also the lower valley of the Brahmaputra, which enters the sea through a delta formed by both rivers. These lowlands of the two rivers are very different from

the Plain of the Indus, for they have a summer rainfall which is very heavy in the eastern part of the region, in addition to the great amount of water which comes from the rains and snows of the Himalayas. The rainfall is supplemented by irrigation in parts, for example, in the region called the Doab, which lies between the Ganges and its great tributary the Jumna. Most of the ground is formed of fertile alluvium brought down by the streams, and consequently the whole region, with the exception of the swamps on the seaward edge of the delta, is very productive, producing wheat, millet, rice, sugar, jute, and indigo on the lower lands, and tea on the mountain borders. It is cultivated very thoroughly and supports a population as dense as that of any other region of the world. There are many great cities, such as Delhi, the capital of the Indian Empire, and Calcutta, the port of the region, on the delta.

The Deccan Plateau.—This upland consists of a great triangular block of ancient, hard rock which as a whole slopes down from west to east, and occupies nearly all the peninsular part of India. On the west side of the block is a very narrow coastal plain, and by the east coast is a somewhat wider one, formed largely by the deltas of the rivers which cross the upland from west to east. The western edge of the plateau is formed by a range called the Western Ghats; the corresponding Eastern Ghats are less wall-like and broken by the broad river valleys. The Western Ghats have a very heavy rainfall in summer from the south-western monsoon; this decreases toward the east, but the south-eastern region has some winter rains, as stated in a previous section. The interior of the plateau therefore has a rather scanty supply, and this is one of the regions of India which is subject to famines due to failure of the monsoon. The Western Ghats, like

the Himalayas and the mountains of north-eastern India, have so much rain that they are clothed with dense forest, but most of the Deccan has a natural vegetation of the jungle type. There are often dense thickets, and tangles of bamboos and grass which grow luxuriantly during the summer and may make passage difficult. The higher parts of the plateau are deeply cut by streams, and this adds to the inaccessibility of large areas. Because of the nature of this country it is less easily cultivated than the plains, and many of the natives are descended from tribes driven out of the better lands by stronger and more intelligent peoples. Hence, most of the Deccan people are less advanced than those of the northern parts of India, they produce less, and the population is not so dense as on the plains. The greatest production is mainly in two areas: one of these is the coastal lowlands where much rice is grown, and the second is a region of fertile volcanic soil which forms the surface of the plateau behind Bombay; here much cotton is grown and consequently a considerable cotton industry has grown up in Bombay. This city is almost as large as Calcutta and is the chief port of western India. Madras, on the fertile east coast, is the third city of India.

The Indian Empire.—The total population of India (including Baluchistan and Burma) is over 300,000,000 people. With the possible exception of China, it is the largest political unit in the world, and its people are many times more numerous than any other group in the British Empire. The government of this great population by the relatively small number of British people is one of the problems of the British Empire which will be discussed in the next book of this series.

Here one can only note the fact that the population of India is very varied in its composition. Several

racés are represented. There are the Indo-Afghans (mainly in the northern plains) who are akin to the people of the Iranian Plateau, and therefore to the Mediterranean race of Europe. In the Deccan are the shorter and browner peoples, called Dravidians and Pre-Dravidians. The Himalayas and Burma are inhabited mainly by peoples of the Southern Mongolian race. Lastly, in parts of eastern India, there are peoples who are descended, or in part descended, from a race which spreads from India to the Polynesian islands of the Pacific, and is therefore called the Indonesian race. The Indonesians, like the Indo-Afghans, and the people of the Mediterranean race of Europe, are wavy-haired and have a dark, but not black, skin. Many of them have features not at all unlike those of Europeans. They are frequently tall and well built ; many of them are intelligent, though they are usually not " educated " as a European would use the word. The highest development among them occurs in some of the Polynesian islands ; in India the Indonesian tribes are of a lower type.

Just as the people of India are varied in their race, so they are in religion. Most of them are Hindus, many millions are Mohammedan, millions more are Buddhist, others are superstitious spirit-worshippers, and a very small proportion are Christians. In languages, again, there is a great complexity ; there are scores of different languages, and this hinders the co-operation or union of the people of India. Indeed, there is no nation of " Indian " people as there is a nation of British, Chinese, or Japanese people.

Ceylon and the East Indies.—Although Ceylon is near India it has a different climate, for it has rain at all seasons and very little difference of temperature throughout the year. That is to say, it has an equatorial type of

climate, and in this respect is therefore like the southern part of the Malay Peninsula and the islands of the East Indies. (See the map of natural regions on p. 63.) Ceylon does not suffer from drought, and famines do not trouble the people; the island is densely populated. There are extensive plantations of tea, rubber, and coconuts; rice is grown over a large part of the lowlands; cacao and cinnamon are also produced in considerable quantities. Similar products are obtained from the East Indian region, but only the island of Java equals Ceylon in this respect.

The islands differ considerably from one another in their productivity although they resemble one another in their climate. This difference is due to two causes, viz. their structure and relief in the first place, and the character of their population in the second place.

A great part of the region consists of mountain chains rising steeply from the sea; such a great chain of heights forms the "backbone" of Sumatra, Java, and the smaller islands which continue the line almost as far as Australia. Almost parallel with the mountain chain of Sumatra is the backbone of the Malay Peninsula, which in the south sinks beneath sea-level. Further to the east stretch the mountain chains which form the more complicated "skeleton" of the great island of Borneo, and the somewhat similar mountain masses which comprise almost the whole of Celebes.

It would seem that the area immediately around Celebes has subsided so that the lowlands have been changed into shallows beneath the sea, while in the case of Borneo the subsidence has been less and the rivers have been able to build up great flood-plains between the mountain ridges.

Similarly it appears that on the west side of Sumatra there has been a subsidence where the mountains go

down steeply into the sea, while on the east the rivers have formed a wide flat plain of alluvial soil.

The last of these great islands is New Guinea ; this has a backbone of heights on the north-eastern side and a great flood-plain in its south-western portion.

The dislocations of the Earth's crust which have occurred in this area are the cause both of the earthquakes which are still felt and also of the numerous volcanoes, active and extinct. Volcanoes are particularly important in Java, for they form many of the high mountains and their outpourings have given a valuable soil to the slopes and lowlands. The volcanic soils of Java are one of the chief elements in its fertility.

Borneo may be contrasted with Java in this respect, for it is not volcanic and its soils are less fertile. Indeed, it may almost be said that there are only two types of country in Borneo : the very steep and densely wooded highlands on which agriculture is almost impossible, and the flat, swampy and frequently flooded plains where cultivation is equally difficult. Java has much more land of moderate heights and gentle slopes.

Except where cultivated, the lowlands of the East Indies are largely jungles ; the uplands are densely forested and the highlands rise into a cooler area where there are trees and grasses like those of temperate lands. The animals of the western islands are like those of south-eastern Asia and include monkeys, elephants, tigers, and rhinoceros, while the eastern islands are like Australia in the absence of these creatures. The dividing line, called " Wallace's line " after the naturalist who observed it, runs east of Java, between the small islands Bali and Lombok, and then northward between Borneo and Celebes.

The peoples of the East Indian region belong to several races. The Indonesians have either mixed with

or displaced darker people with woolly hair. These latter people are grouped with the negro races whom they resemble in several respects; they are called negroid and include the Papuans. Papuans are the inhabitants of New Guinea, in the wild country of which they have maintained themselves although driven out of other islands; they are a backward people who appear grotesque with great mops of frizzy hair piled high on their heads.

The Southern Mongolians have also spread into these islands, and from some of these Mongolians, probably with an admixture of Indonesians, have descended the Malays. The Malays are seafarers who have spread not only over this island region but westward across the Indian Ocean to Madagascar and northward along the Pacific margins to South China and Japan.

Other peoples have influenced this region. For example, the Javanese, who are mainly of the Indonesian and Malay races, have been conquered by Indian invaders who taught them agriculture and other arts and converted them to the Hindu religion; later, Arab warriors and traders came among them and imposed Mohammedanism upon them. It is partly because of the knowledge and habits they acquired from their Hindu and Arab masters, that the Javanese are much more advanced than the inhabitants of the other islands. Consequently the Dutch, who conquered most of the region a few centuries ago, were able to get them to work in plantations with great success, and the population of Java has increased from about two millions at the beginning of the nineteenth century to over thirty-five millions at the present time. Thus Java is exceptional among equatorial lands in having a very dense and fairly prosperous population.

Borneo is very different not only in its physical geography but also in its human geography. The chief

inhabitants are the Dyaks, a people little advanced in agriculture and little affected by the Hindu and Arab invaders who taught so much to the Javanese. They are pagans, and among them still exists the practice of head-hunting. The tribes raid each other to obtain human heads which are dried and preserved as trophies ; the heads are thought to be proofs of courage and are supposed to keep away evil from the village of the possessors. The Dutch have been unable to develop Borneo as they have developed Java, and indeed parts of Borneo, as well as New Guinea, are very little known to this day. Although Borneo is four times as large as Java it has only one-twentieth of the population.

The mineral wealth of the East Indian region is considerable, and already much tin is obtained from the Malay Peninsula and the islands adjoining it, and oil is produced in Sumatra, Java, and Borneo.

Taking the region as a whole, the chief exports are tin and oil, rubber from trees transplanted from the equatorial region of South America, sugar from the sugar-cane, tobacco, tea and coffee, spices, coco-nuts and copra, and timber, especially the valuable and hard wood called teak ; rice and sago are obtained as food for the natives.

The great trading centre for these products is Singapore on an island at the extreme south of the Malay Peninsula. Singapore is also a very important coaling-station ; it is situated at the meeting-point of the trade routes from Europe by the Suez Canal and Southern Asia, from the Atlantic countries by the Cape of Good Hope, from Australia, and from the Pacific coasts of America and Eastern Asia.

The Dutch are the masters of the greater part of the East Indian region and derive much profit from the plantations and the commerce of the islands ; the British

rule the Malay Peninsula and parts of Borneo and New Guinea.

Indo-China.—The mountain chains of the Central Highlands of Asia seem to curve round to the south where they meet the great block of hard rock which forms the central portion of China. At this point they appear to be compressed and form high ridges between which are very deep, steep-sided valleys of the rivers which flow from the Central Highlands and also turn southward; the largest of these rivers are the Salwin and Mekong. This district of high, bleak ridges and deep, hot, and unhealthy valleys with raging torrents is very difficult to cross, and has hindered the movement of people between India and China; the civilisations of these two countries have therefore grown up apart from one another, and the peoples and customs of India are very different from those of China.

South of this tangled knot of highland, the mountain chains widen out in the wide peninsula of Indo-China, and between them other rivers are formed, such as the Irawady in Burma and the Menam in Siam. All the four rivers of the peninsula have built up deltas, and on these deltas live the majority of the people of the region.

The climate is very much like that of India: a summer monsoon from the south-west or south brings most of the rain; a "winter" monsoon from the north-west brings rain mainly to the projecting bulge of the eastern coast known as Cochin-China. The temperature is high in summer and not very much lower in the cooler season. Under these conditions the well-watered highlands are forested and much of the lowland is jungle. During the wet season the valleys are flooded with the water which runs rapidly down from the mountains, and the plains are turned into sheets of water. Consequently the people

almost always build their houses on piles, and many of them live on the lower parts of the rivers in boats covered with a roof of matting. Bangkok, the capital of Siam, is a great city of about one million inhabitants, and some hundreds of thousands of these live on the river. The rivers are the chief highways and boats are the chief means of transport in this country of mountains and jungles. The rivers also provide fish, which give a welcome and nutritious addition to the main diet of rice.

The lowlands are well adapted to the growing of rice, for the fields have to be flooded for the early growth of the rice plant ; such great quantities of rice are produced that there is a surplus which is sent from Rangoon in Burma, Bangkok in Siam, and Saigon in French Indo-China, to Europe and America and also to Japan.

Besides rice, teak is exported in large amount. The trees grow on the mountain slopes and have to be transported to the rivers ; they are so heavy that elephants are used to drag them through the jungle. At the rivers they are loaded on to rafts made of the light bamboo, for teak is heavier than water and therefore sinks unless supported. The rafts drift down to the ports, Saigon, Bangkok, and Rangoon, where one may see

“ Elephants a-pilin’ teak
In the sludgy, squidgy creek,”

as Kipling described.

There are a number of mineral deposits ; oil and rubies are obtained in Burma and tin in Siam, but the many other minerals are not yet worked to any extent.

The peoples of Indo-China are largely of the South Mongolian race, and Buddhist in religion. They are kindly and good-natured ; they like an easy life and this is to be obtained, at least by the men, who leave the women to do the greater part of the work of rice-growing.

As the natural conditions favour the growth of rice and there is plenty of land for the rather scanty population, life can be lived very easily, the chief drawbacks being the diseases due to the hot, wet climate and to the insects. In the interior the wild tribes raid one another to obtain slaves, and warfare is therefore frequent.

In the coastal regions there has been a great change. The British have established their power in the west ; the French have secured the regions known as Tongking, Annam, and Cambodia in the east ; in the south is the independent kingdom of Siam. Where the authority of these states is effectively maintained, peace has been secured and commerce has been developed. But the native peoples have not taken to the steady labour necessary for work in the rice plantations, the mills in which the rice is husked and polished, or in the shops, offices, and docks of the cities.

The work in these places is largely done by Indians or Chinese who have recently immigrated, and the Chinese succeed remarkably well, so that the Chinese form a large proportion of the population in the coastal regions and a number of them have acquired considerable wealth.

Moreover, the industries, trade, and transport are organised and financed (that is to say, the money for them is provided) almost entirely by English, French, American, Japanese, and Chinese, so that the natives of Indo-China now play a small part in the region. Siam, which has a population of eight million people, has many foreign immigrants and its development is largely dependent upon foreign organisers and financiers, but its government is an enlightened one and it is making wise use of Western knowledge and experience. It is to be hoped that Siam will now succeed in maintaining its independent position, although in the past part of its territory has been taken

by the British on one side and by the French on the other, and although it is entirely surrounded by countries which have been annexed by other states.

The South China and Philippine Region.—The great country China must be divided into three distinct regions: Southern, Central, and Northern. Southern China consists largely of the basin of the Si-kiang, Central China is drained by the Yangtse-kiang, and Northern China by the Hwang-ho. (Both “-kiang” and “-ho” mean “river.”) Southern China is tropical in its climate; the other two regions may be described as warm temperate and cool temperate, respectively.

In many respects South China is like Indo-China, and with it may be grouped the islands of Formosa and Hainan, and also the Philippine Islands which almost shut in the eastern side of the South China Sea. These lands have most of the rain in the hot season, and less rain in the cooler part of the year; the natural vegetation is largely forest and jungle, but much of the region has been cleared for cultivation. Great quantities of rice are grown and also sugar-cane, tobacco, cotton and tea, and camphor is obtained from Formosa, while “Manila hemp” is exported from Manila, the chief town and port of the Philippines.

The bamboo is one of the most useful plants of this region; from it the Chinese make the walls and roofs of their houses, much of their furniture, many articles of common use, and even bridges across the streams.

The region as a whole is well populated, especially the lower Si-kiang valley and the coast lands of southern China, where even the mountain slopes are carefully cut into terraces in which the soil is held up by stone walls. Water is laboriously lifted from terrace to terrace by buckets, and here, as all over China, the people work most

industriously and patiently, making the utmost of the agricultural resources of the country.

At the head of the Si-kiang estuary is Canton, a crowded city with over a million inhabitants, of whom one-quarter live in boats on the river. At the entrance to the estuary is the island of Hong Kong, a British possession, with over half a million people; it is the great "entrepôt" or trading centre of the region. Here the exports are collected for shipment, mainly to Europe and America, and here the imports are landed for distribution throughout Southern China. As a result of this trading, shipbuilding is carried on here, and a number of manufactures such as the refining of sugar and the preparation of tobacco.

Hainan is a part of China, but Formosa has been acquired by Japan although its inhabitants are mainly either of the Malay race or Chinese settlers. The Philippine Islands are held by the United States; they are inhabited by about ten million people, mainly "Filipinos," akin to the Javanese and rather like them in characteristics. The Philippine Islands were conquered by Spaniards in the sixteenth century, and most of the people have been converted to Christianity, only a relatively small number in the southern islands remaining Mohammedan. There has been intermarriage between Spaniards and Filipinos, and the half-caste descendants called "mestizos" are often wealthy and well educated. They form the most influential portion of the population, and took a large part in the revolts of the natives against the Spaniards which occurred at the end of the nineteenth century. In 1898 there was war between the United States and Spain in regard to Cuba, another Spanish possession, and in consequence the United States took over the Spanish colonies Cuba and Porto Rico in the West Indies and also the Philippines. The Filipinos

have been granted a considerable measure of self-government, but those of them, mainly the half-castes, who are interested in the matter, demand complete power in this respect. Meanwhile the United States officials have done much to improve the productivity of the land and the conditions of life of the people.

The Philippine Islands form one of a number of groups which are arranged like festoons along the eastern coast of Asia ; together with the peninsulas of Korea and Kamchatka they enclose a number of seas : the South China Sea, the East China Sea, the Yellow Sea, the Sea of Japan, and the Sea of Okhotsk. The intricate intermingling of land and water bears witness to the subsidence of the whole region ; accompanying this great dislocation of the Earth's crust has been much volcanic activity, and volcanoes are found in most of the island groups. The period of dislocation is not yet finished, for many of the volcanoes are still active, and earthquakes are still felt along almost the whole of the Pacific margins.

Central China and Southern Japan.—This region, situated on the two sides of the East China Sea, lies just north of the Tropic. In summer winds from the south-east bring heat and rain, but in winter north winds bring cold and relatively dry weather. Because Southern Japan has sea on both sides of it, it has a greater winter rainfall than China. For the same reason Southern Japan has a warmer winter than Northern China, which lies in the same latitudes, and it is therefore to be grouped with Central China ; the temperatures for Shanghai, shown in Fig. 5, on p. 67, are very similar to those for Tokyo. Note that the winter temperatures are about equal to those at London, although Shanghai is nearly 20° nearer the equator and has a very much hotter summer. The extreme climate of the eastern coast of Eurasia as

compared with the relatively equable climate of the western coast is shown by the curves for Gibraltar and Shanghai in the same diagram.

The natural vegetation of this region is forest, but except on the highest ridges and steepest slopes the ground has been taken for cultivation, and trees are relatively scarce, especially in China.

The Yangtse-kiang descends from the Central Highlands of Asia by a rushing torrent into the province of Yunnan, where China extends south-westward into the highlands of Indo-China ; in this remote province there are great but largely undeveloped resources of copper, tin, and silver. After passing through Yunnan, the Yangtse enters the western part of the Central Chinese region, known as the Red Basin from the colour of its fertile soil. Although this is an upland region, the summer temperatures are sufficient in this latitude to ripen the crops, and the people have made a wonderful system of irrigation, using the water of the streams that come down from the borders of the great Highlands. Indeed, because of the great mountains behind, this part of China always gets some rain and some water from the mountain streams, even when the monsoon rains fail and famine brings disaster to other parts of the country. The Red Basin has great and practically untouched deposits of coal and iron ; it has also much salt.

The Yangtse-kiang leaves the Red Basin by a series of rapids in a great gorge cut through a belt of granite. It emerges at the town of Ichang, which is the highest point which vessels can reach from the sea without great difficulty. Consequently the Red Basin is rather isolated from the world.

Below Ichang is another and still greater basin-like area ; parts of it are so low compared with the surrounding country that great lakes are found on either side of the

river's course, and in the rainy season the water turns large expanses of plain into sheets of shallow water ; this region therefore suffers sometimes from floods as well as from droughts.

By the river, and almost in the centre of this " Lake Basin," is a group of three towns which form one of the great collections of people in the world : Hankow, Hanyang, and Wuchang together have a population of probably about two millions, but no accurate census has ever been taken in China. This group of towns is so important because it is an inland port at the centre of the vast river system of the Yangtse and its tributaries, a river system which carries practically all the traffic of the largest and most densely populated part of China. There are few railways in China, and the roads are narrow, most of the carrying being done in wheel-barrows or on men's shoulders. It is therefore fortunate for China that its greatest river is navigable for ocean-going steamers as far as Hankow, nearly 700 miles from the sea.

Few animals of any kind are kept in China, either as beasts of burden or for food, as they would need land on which to graze. The land can be used to greater advantage by being devoted directly to producing food for people, and in this overcrowded country it is rarely used for any other purpose. But pigs and poultry are kept because they occupy little ground and can eat food not fit for human consumption.

On the small and carefully tended patches of ground which each family possesses, the people obtain rice and sugar for their own food, tea for their own use and for export, silk (also used at home and exported) from the silk-worms fed upon mulberry leaves ; they also grow cotton, bamboo, and poppy plants. From the seed-vessel of the poppy opium is extracted, a drug obtained and used in most parts of China.

There are mines in this region, and at Hanyang are great iron and steel works using coal, iron, and limestone from the neighbourhood.

The Yangtse turns northward from this Lake Basin to its delta region, another area of many lakes and similarly liable to floods. Just above the delta is Nanking; the name means "Southern Capital" in contrast with Peking, the "Northern Capital;" for some centuries Nanking was the seat of government of China. Close to the estuary of the river is Shanghai, a city of a million inhabitants, the great port of entry to Central China. Shanghai is a centre also of the manufacturing which is being developed in China by foreign organisers and financiers; cotton mills are at work manufacturing relatively cheap goods for the Chinese market, although the finer qualities are still imported from England and other countries.

The coastal district south of the Yangtse delta is especially productive and densely populated; even the mountain slopes of this region grow tea and rice, and the sea (like the rivers) yields fish which are an important part of the diet of the Chinese; even seaweed is used as food.

Southern Japan, in respect of climate and productions, is more like Central China than like Northern Japan. The difference between South and North in Japan is partly due to latitude, partly to the currents which drift past the coasts. Off Southern Japan flows the warm Kuro Shiwo current from the tropical sea near the Philippines; when the wind blows across this current to Southern Japan warm and moist air crosses the land.

A very different current from the Bering Sea area of the North Pacific drifts southward past Northern Japan, and the winds from it bear cold and drier air to that part of the country.

The warmth and rain of Southern Japan give it an abundant vegetation ; tea, cotton, sugar, rice, and tobacco are produced in the lowlands and on the lower slopes of the mountains, where there are also orchards of mulberry, cherry, and other fruit trees. Above these there is much high mountain land whose steep sides are clothed with forests of chestnuts and oaks, pines and cedars.

A considerable part of Japan is mountainous, and there are many volcanoes ; the beautiful cone of Fujisan (commonly called Fujiyama by English people) rises steeply 12,000 feet above the plains near Tokyo ; it is a beautiful sight, especially during the winter when its top is covered with a smooth mantle of snow. The Japanese love, and almost revere, this view, and frequently decorate bowls and other articles with a picture of the great white cone. Japan is indeed a very beautiful country, and the people appreciate its natural beauties ; they grow the cherry-trees not for their fruit so much as for their wealth of blossoms.

Their villages and towns, too, are much more attractive, and far cleaner, than most European villages and towns. Because the country frequently suffers from earthquake shocks the houses are built largely of bamboo or timber supports, and movable screens form part of the outer walls ; these screens are removed during the day (except in bad weather) and the houses are then exposed to the air. The roof is solidly built, for this must be well constructed to withstand the heavy rains and the strong winds of the storms called typhoons which come in from the ocean near China and Japan.

The houses have little furniture beside bamboo stools and mats of rice-straw, and the Japanese, like the Chinese, live very simply and frugally. They work equally hard, for in both countries there is serious overcrowding of people upon the land.

China Proper (*i.e.* excluding Tibet, Sinkiang, Mongolia, and Manchuria) has an area of 1,500,000 square miles, and a population of over 300 million people. Japan (excluding Formosa and Korea) has an area of 150,000 square miles and a population of nearly 60 millions ; it is therefore more densely populated than China or the British Isles. The Japanese Empire, with its possessions, has a population of nearly 80 million people and is one of the great states of the world.

The fact that Japan is more densely populated than the British Isles is remarkable because its population is mainly dependent, not on manufactures and trade as in Britain, but on agriculture. Yet the area of cultivable land in Japan is strictly limited although most carefully used ; as in China few animals are kept, but there are many fishermen who add to the too-scanty food supply. Most of the people are poor, and now that the arts of manufacturing and commerce have been learnt from western nations these latter occupations are growing rapidly.

As there are not great stores of coal and iron in Japan these minerals are in part imported from China to carry on the great iron and steel works and the shipbuilding yards established in some of the ports. There are also factories making goods of cotton, silk, paper, and other materials ; these factories are well equipped with the best machinery and excellently organised, and the work is done very skilfully by intelligent and efficient workers.

The manufactures of Japan will be greatly helped when the enormous water-power of the country is fully developed ; for the heavy rainfall which falls on the mountains will yield far more power than is at present utilised.

The manufacturing is not an unmixed blessing to Japan. For example, the workers are generally badly

paid, and many of them are women and children who work long hours and lead hard lives. Similarly bad conditions of work exist in the growing industries of China, but improvements in this respect are now being made in both countries.

The great cities of Japan are all in the south. The most south-westerly of the group of islands of which Japan is formed is Kiushiu, and upon it, facing China, is the port Nagasaki with a magnificent harbour due (like the many bays and straits which intersect all Japan) to the subsidence of the region ; near Nagasaki are coal-fields which aid its shipbuilding works.

Near the middle of the south coast of the main island, Honshiu, or Hondo, is the Bay of Osaka, at the head of which is the town of the same name, and near by on the same bay is Kobe, another centre of shipbuilding. Osaka is the " Manchester of Japan," and has more people than the English Manchester.

Further to the west is the Bay of Tokyo, at the head of which is Tokyo, the capital, a city of over two million inhabitants, and many factories in which all kinds of goods are made. Because the harbour of Tokyo is too shallow for any but very small vessels, its port is a few miles away on the same bay ; this is Yokohama, which has more foreign trade than any other city of Japan.

These large cities have been partly rebuilt in the western fashion, and the business quarters resemble European business cities, but one of the large towns has suffered little change. This is Kyoto, the old capital of Japan, which lies behind Osaka. The native buildings and ways of life are still preserved there ; beautiful bronze and porcelain work is to be seen ; brocades and embroidery, very unlike the cheap machine products of the factories, are made ; temples and palaces, mainly built of wood, show the architecture of old Japan.

The People of China and Japan.—The Japanese people are like the Chinese in many respects ; they both belong in the main to the same South Mongolian race, but there has been considerable admixture of other peoples with the Japanese. For example, there has in past centuries been migration from Korea, whose people are described later. Also when the ancestors of the Japanese entered the country more than two thousand years ago, they found a wavy-haired and bearded people with whom they mingled to some extent but whom they displaced from the greater part of Japan ; a small number of the descendants of these people, called Ainus, still live in the northern island Yezo (or Hokkaido), and in Saghalin still further to the north. Finally, Malays have worked northward to Japan along the chains of islands and have affected the population of the southern part of Japan. Perhaps it is to this mixture of races that the Japanese owe the many qualities which make them stand out from other Asiatic peoples : their industry and perseverance, their intelligence and the ability to learn quickly from others, their love of beauty in nature and their skill in various forms of art.

The Chinese are quite as industrious and persevering, and they are also quite intelligent, but they are not as willing to accept and act upon new ideas. They honour the past and most of them wish to retain old ways ; they are markedly conservative. This trait of the Chinese is partly due to their religious ideas in which the worship of ancestors plays a large part. They are frequently said to be Buddhist, and it is true that the teaching of Buddha spread from India over China, but it has been considerably altered in course of time, and the Chinese also revere the teachings of two other great thinkers who lived about the same time, Lao Tzu and Confucius. Both taught a code of moral behaviour, and two characteristics of the Chinese

are derived from these teachings. One is the courtesy of their behaviour, their moderation of speech and action, and their self-restraint ; the other is their " filial piety " which Confucius said was the basis of all happiness. The educated Chinese show the greatest deference and respect to their father and grandfather and to their ancestors, while among the uneducated this has become actual worship. They therefore think it wrong to depart from the ways of their ancestors, and this has prevented most of them from being willing to follow the ways of foreigners or even to welcome foreigners themselves.

Connected with the filial piety of the Chinese is the close bond which knits each family together. They think of themselves as being members of families which extend back into the past and will go on into the future ; and this bond seems to them to be closer than that which binds together Chinamen of the same district but of different families. Similarly they have little feeling of patriotism or loyalty to the State as a whole.

This is another difference between Chinese and Japanese, for the latter are intensely patriotic and the real religion of most Japanese is worship of the Emperor or Mikado, who is regarded as a god living on earth. This idea is the central one in the religion called Shinto, " the Way of the Gods," which is the most important belief of the Japanese, though Buddhism and Confucianism are also held.

The latter religions were introduced from China, whence came most of the culture of the Japanese until recently. The Japanese language is written with " characters " borrowed from the Chinese. In European languages each written word is made of certain letters, but in Chinese each written word is like a small and simplified drawing of the thing it represents ; consequently there is a different character for every word, and

a Chinese dictionary has scores of thousands of such word-characters. This makes the language very difficult to learn, and it is very difficult for the Chinese to express new ideas borrowed from western nations in such a language. The Japanese borrowed the characters of the Chinese and use them to write their own language which, however, is quite different from Chinese.

In China itself there is one written language used all over the country by the educated people, but the uneducated people do not understand it and the spoken language differs in the various regions; the language of South China, for example, is markedly different from that of Central China. This difference of language is another hindrance to the growth of a patriotism which would regard China as a unit and all Chinese as members of one community.

The civilisation of the Chinese has greatly influenced that of Japan; they have a literature and an art which is unequalled in its own way. It is often difficult for Europeans untrained in Oriental methods of expression to appreciate the forms of Chinese art, but it aims at conveying ideas and emotions in as simple and pure a form as possible. Thus Chinese drawings have few lines, and their poems use a few words, very carefully chosen, to express the meaning.

The Northern China Region.—This might perhaps be called the Yellow Sea Region, for it extends on either side of that submerged area and so includes both Northern China and also the eastern and lowland part of the peninsula of Korea. The western and highland part of Korea is grouped with the similar coast-land of Siberia immediately north of it and the north of Japan on the other side of the Sea of Japan.

It may be noticed that all the inland seas adjoining

the coasts of Eastern Asia have lands on each side of them similar to one another in many respects and therefore to be classed in the same region, even though on the one side is mainland and on the other side is a group of islands.

Central China is separated from Northern China by the Tsinling Mountains, and by the lower hills which continue them eastward almost to the coast and form the water-parting between the Yangtse-kiang and the Hoangho. Northern China has a markedly different climate, and therefore different productions and even a different appearance, from those of Central and Southern China. Its summer is not so hot and the rainfall is considerably less; in the winter the winds come from the northwest, that is, from the Gobi Desert region, and bring very cold and dry weather. Hence Northern China has a warm and fairly well-watered summer, and a distinctly cold and practically rainless winter. As the summer rains are not abundant, even a relatively slight failure of the monsoons reduces it below what is necessary for the crops, and so famines are of frequent occurrence. In the winter, the temperature of the region is below freezing-point (note the position of the 32° F. isotherm for January in the map in the atlas), but the greatest discomfort comes from the dust blown from the desert interior; during such dust-storms the sun is hidden and people have to go indoors and shut all windows tightly.

Very fine dust has been blown from the desert into this region for thousands of years, and over large areas of Northern China it has accumulated and become packed together into a stiff yellow soil, called "loess." *

* Note that the same name is applied to the soil of Europe and North America, formed on the edge of the glaciated regions from wind-blown particles. See the preceding volume of this series, "Europe of To-day," p. 56.

The loess of China is fertile if it gets sufficient moisture ; where there is a good rainfall or where irrigation brings water from the highlands the ground gives good crops, elsewhere it may be of little value. Where it is cultivated, the fields take practically all the ground and the roads are merely deep, narrow trenches worn many feet below the level of fields by the traffic of centuries cutting into the soft loess. In some parts the people live in caves cut into the sides of these roads and hence extending underneath their fields.

Much of the great lowland of North China might almost be called the gift of the Hwang-ho. The name means Yellow River, and refers to the colour given to the waters by the yellow soil the river has worn away in its upper course ; the same material has been dropped in the lower course and thus the whole plain has been built up. Now the material is still being in part dropped in the plain but in part is being taken to the coast. Consequently this is being extended outwards and so encroaching upon the Yellow Sea, whose name again indicates the influence of the loess material.

Although it has brought down a fertile soil and built up a fertile lowland, the Hwang-ho is by no means an unmixed blessing ; indeed, it is often called " China's Sorrow." As it drops mud in its bed, this is gradually raised above the level of the surrounding country ; the river is only restrained from running over by high banks or dykes built by the people. In flood times so much water is brought down that the banks may be burst, and the river pours over the lowland, the fields and villages are overwhelmed by the waters, crops are destroyed and people drowned. The river may even cut a new channel to the sea ; then the old course has no water and the irrigation system is ruined. This catastrophe has occurred again and again ; in fact, it is only by such

changes of course that the great delta-plain has been built up.

At the present time the Hwang-ho enters a part of the Yellow Sea called the Gulf of Chihli, separated from the main body of water by the rocky peninsula of Shantung. Many atlases show another course of the river, marked as the old bed of the Hwang-ho, which goes to the south of the Shantung peninsula. The break came in 1854, and as a consequence there were thousands of people drowned; many more died of starvation or of disease due to exposure and hunger.

In spite of all drawbacks the population of the Hwang-ho plains is as dense as that of almost any other part of the world. Rice is little grown in Northern China, wheat is grown and used to some extent, but the chief foodstuffs are millet, sorghum, and soya-beans. From the yellow-seeded millet a nourishing but coarse bread is made. Sorghum is sometimes called giant millet, for it is a rapidly growing plant reaching a height of twelve feet; it is useful in several ways—a black bread is made from the grain, the stalks are used for roofs, fences, and fuel, the roots are also used for fuel, and the leaves are fed to animals. Soya-beans are largely used as food in China; they are also exported to Europe for the oil which is pressed out of them, while the residue is used as a cattle-food. A little cotton is grown and in the warmer parts mulberry-trees may be grown for silkworms, but most of the silkworms are fed on the leaves of shrub oaks.

There are few trees here; most of the mountains have been de-forested and the country generally has a bare and uninviting appearance.

Great stores of mineral wealth exist; the hard rocks which form the uplands of Shantung hide coal and oil, while in the uplands on the eastern side of

the plain, in the province of Shansi, is one of the greatest and most valuable coalfields of the world, where anthracite in enormous quantities can be obtained with very little mining. The great development of this and its application to industries have yet to come.

In the extreme north of the region is the capital of China, Peking, a city of nearly a million inhabitants. Peking is situated in a sandy plain on the Chinese side of a pass which leads across the mountain edge of the Mongolian Plateau. Here the Northern Mongolian conquerors of China, who came through this and other passes, established themselves. The city is walled around like a fortress, and within it are two distinct towns separated from one another by walls. The southern one is the Chinese town ; the northern is the Manchu town where the Manchu Emperor and the Manchu soldiers and officials lived. Since the Chinese threw off the Manchu domination in 1911, this district has been the government centre of the Chinese Republic. The port of the region is Tientsin, on the Pei-ho, halfway between Peking and the sea.

Although Peking has a situation which may have been suitable for rulers who came from the north, it is not in a good position to serve as the capital of such a great state as China. The south of China is very much out of touch with it, and the problem of communications is a serious one.

In the seventeenth century a great canal, called the Imperial Canal, was constructed from Tientsin southward through Nanking to Hangchow, south-west of Shanghai ; this canal is still used, but more important are the railways which have been built with capital lent by other countries. One line goes from Peking in more or less the same direction as the canal to Shanghai and

Hangchow. Another goes west of this to Hankow, and then southward across the "Lake Basin"; it is proposed to continue it still further and to join up with a shorter line which goes northward from Hong Kong through Canton. These long main lines have branches going out to east and west, *e.g.* one to the great coal-field of Shansi, and another through a coalfield of Shantung to the port Kiaochow on the south side of the Shantung Peninsula.

North-eastward a railway goes from Peking to Manchuria and then joins on to the Siberian Railway, so that by a roundabout route there is railway connection between Europe and China.

The lowlands of Korea are as fertile as those of Northern China; in the southern and warmer part even rice, cotton, and tobacco are grown; soya-beans are obtained in great amount, and silk is another product; with the fisheries these resources support a numerous population.

Forests are rare in this part of Korea, but the Japanese, who have annexed the country to their Empire, have planted hundreds of millions of coniferous trees on the bare hills. They have also improved the agriculture and fisheries and begun to exploit the minerals, for Korea has rich deposits of coal, iron, gold, copper, silver, and other metals.

The Koreans, like the Manchus of Manchuria, are not purely Mongolian and their features are not quite like those of the Chinese. They are probably descended from a mixing of Northern Mongolians from the Central Asiatic areas with wavy-haired peoples who lived in North-eastern Asia and of whom the Ainus are a branch. Like the Ainus and the other peoples of North-eastern Asia, they are far behind the Japanese and Chinese in their ways of life; their dwellings are squalid and their

work is inefficient. Yet they are quite capable of development, and Japanese officials and teachers and American missionaries have already greatly improved conditions, *e.g.* in regard to health, education, and the return got from their agriculture.

The Amur and Japan Sea Region.—The lands around the Sea of Japan have a sea-level temperature lower in summer than any part of China or Southern Japan (see the isotherms for July in the atlas map); moreover, they are mountainous and hence their actual temperature is still lower. In the northerly part of the region the winters are very cold, as may be seen from the temperature graph for Vladivostok, situated in the centre of this region (Fig. 6, p. 72).

The valley of the Amur is lower than most of the area, but its summer temperature is not high, and as it is separated from the sea by highlands its winter is particularly cold and long. The whole region is therefore less fertile than those lying to the south, and the hardier cereals such as barley and rye are typical products. Indeed, the productivity of the lands is not great, though the region is heavily forested, mainly with coniferous trees, and there are considerable mineral deposits; the coalfields of Yezo are specially important. At present the population is scanty, except in the main island of Japan.

Vladivostok is the Pacific terminus of the Siberian railway, but as a port it suffers from being closed by ice for about four months (note the times of the year at which the temperature curve drops below and rises above freezing-point). Because of this drawback, the Russians, who have for centuries wanted to reach the world by an ice-free port, built a branch of the railway through Manchuria to the Liaotung Peninsula which together

with Shantung almost encloses the Gulf of Chihli. At the end of this peninsula they established Port Arthur, which is ice-free all the year round. How this port passed into the possession of Japan will be described in a later section.

The Manchurian Basin.—This region is almost entirely surrounded by highlands, the Khingan escarpment cutting it off from Central Asia and the mountains of Korea and Siberia from the Pacific; its chief river, the Sungari, escapes by a valley northward to the Amur, and it has a narrow exit to the Gulf of Chihli west of the Liaotung Peninsula.

Thus enclosed, it has an extreme climate with relatively little rain. The mountainous borders are forested, and in the plains of the interior there is grass land with patches of scrubland. These plains are for the most part covered with fertile soil, on which the people grow millet, for their own food, and beans and wheat, which are largely exported. The future of the agriculture of Manchuria promises to be important, as there are large expanses of good land not yet used; the country will probably become one of the great wheat-fields of the world. Mineral resources will also be developed, for there are coal, iron, gold, silver, and lead. The chief towns are Harbin, at the junction of the Vladivostok and Port Arthur branches of the Siberian Railway, and Mukden, the capital, where the southern branch is joined by other lines going eastward through Korea and westward to Peking.

The Manchus are very few in number; the great bulk of the population of twenty millions is made up of settlers who have recently come into the country from the surrounding regions: agricultural colonists from overcrowded China and less fertile Russia, refugees who

left Korea after the Japanese annexed it, and Japanese settlers, traders and officials. Japan manages the southern Manchurian railways and is the virtual master of the country although Manchuria is nominally a dependency of China.

AUSTRALASIA

Australia.—South of the East Indies lies the island-continent Australia. In several ways it resembles the part of Africa which lies in the same latitudes, for it is a block in structure, with a compact shape and great expanses of upland. But the central part of the Australian block has been somewhat depressed ; hence there are broad lowlands separating two highland areas, viz. the Eastern Highlands, which extend through the States of Victoria, New South Wales, and Queensland, and the great plateau which forms most of West Australia, the western part of South Australia and the Northern Territory. The greatest lowland areas are therefore those of the centre, drained by the Murray-Darling River system to the sea or to Lake Eyre which is below sea-level.

There has also been a slight sinking of the continent as a whole, so that the sea has covered part of the central lowland area, forming the Gulf of Carpentaria in the north and smaller gulfs in the south. The same sinking of the whole area has caused the sea to separate Australia from New Guinea by Torres Strait and from Tasmania by Bass Strait ; it has also formed good harbours such as those by which Melbourne and Sydney have grown up. Thus there is more variation in relief and outline in Australia than in South Africa.

In climate, too, there are certain resemblances between the two continents in the same latitudes. In the south-west of each is a coastal region of the Mediterranean type,

with equable temperature and winter rains. North of this is an arid or semi-arid region of greater heat, and north again is a region with very hot, rainy summers and dry cooler seasons.

As in Africa, so in Australia the south-east trade-winds blow throughout the year in the latitudes near the Tropic of Capricorn, and the arid region is the result. South of the belt of the constant trade-winds is the region of the Mediterranean type where these winds blow only in the (southern) summer when the sun moves southward, while in the (southern) winter the northward swing of the sun is accompanied by the northward swing of the westerly winds with their cyclones and rains. North of the belt of constant trade-winds is the region of summer rains which come when the overhead sun reaches this hemisphere. Thus the climatic belts of the world affect Western Australia and Western Africa in much the same way.

The natural vegetation of this western part of the continents shows a similar correspondence; the ever-green trees and shrubs of the south-west give place northward to scrubland and desert, and these again to grasslands of the Savanna type. (Compare the map of the natural regions of Australia with that of the natural regions of Africa.)

The extreme north of Western Australia shows a contrast with corresponding latitudes in Africa, for there are coastal lowlands which receive much rain and therefore have a jungle-like vegetation, at parts becoming tropical forest. These exceptional conditions are due to the presence of sea to the north and to the consequent wind system of northern Australia, which is of a monsoon character and must be compared with that of Southern Asia. Just as in Asia the summer is a period when the air over the land has a higher temperature and lower

pressure than that over the sea, with consequent in-blowing winds and heavy rains, so in Northern Australia in its summer there are the same phenomena. But in this region of the southern hemisphere, the wind blows southward to the land and is deflected to its left; thus it

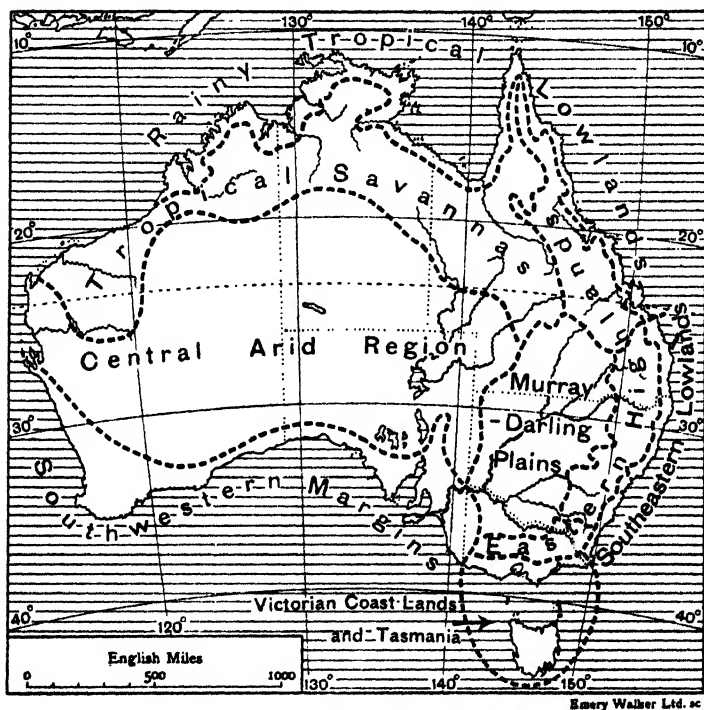


FIG. 7.— Natural Regions of Australia.

arrives in Australia from the north-west, and northern Australia has rainy north-west winds in its summer.

Conversely, the winter is a period of lower temperature and high pressure over the land, out-blowing winds from the south-east and consequently drought. Yet the summer rains of the north coast (like those of Southern

Asia) are sufficient to permit a jungle growth and to enable trees to maintain themselves through the year.

Eastern Australia has climatic and vegetation regions which in part correspond with those of Africa. The coastal lowlands are well watered ; they are largely in the belt of the trade-winds which here, as in South-eastern Africa, blow from the ocean and consequently deposit moisture as they rise over the land. The northern part (extending a little distance south of the Tropic) has considerable heat and most of its rain in the summer ; and consequently it may be compared with the Mozambique region. The southern part (as far as Cape Howe) is cooler and has rain throughout the year ; these south-eastern lowlands may be compared with the Natal region.

Behind the narrow coastal lowlands are the Eastern Highlands ; these are fairly well watered and are covered with trees and grasses, but behind them the lower plains receive little moisture from the trade-winds. The northern part of these plains forms part of the tropical savanna lands ; the southern part, the Murray-Darling plains, is cooler and is to be classed with the steppe grasslands of temperate latitudes.

The coast lands of Victoria and the island of Tasmania are farther from the equator than any part of Africa. They are in the latitude of Northern Spain, and are therefore just beyond the Mediterranean climate belt. They are in the belt of westerly winds throughout the year ; hence they have an equable temperature and rainfall at all seasons.

Australia has very few inhabitants. When Europeans settled there at the end of the eighteenth century, they found only a small number of natives and these were very backward in their way of life and had made little use of the resources of the country. Although Australia became a British colony, it is so far from Britain that relatively

few colonists have emigrated. For a time brown men from the Pacific islands and dark-skinned and yellow men from Asia came or were brought to work in Australia, but the European Australians feared that if these coloured people increased in numbers they would overwhelm the white people and make the country very different from what the British colonists desired it to be. Hence they have adopted a "White Australia" policy, and prevent the immigration of coloured peoples.

Yet the white men have hitherto been able to develop only a small part of the continent; the northern part of the continent is climatically unsuited for Europeans, much of the interior is too dry for occupation, and only in the well-watered and temperate south-eastern portion is there any considerable population. The population of the whole continent is only about six million people.

At the present time, parts of the western, southern, and eastern margins of Australia, together with Tasmania, are cultivated and yield various grains, especially wheat and oats, fruits, and hay. Sheep are reared and wheat is grown on the Murray-Darling plains, cattle are kept in the warmer lowlands, while from the Eastern Highlands, Tasmania, and the great plateau of West Australia gold and other minerals are mined. There are large coal and iron deposits, and these and the water-power of the Eastern Highlands will doubtless in the future be utilised for manufacturing. With these developments and with the development of agriculture over the vast spaces at present untouched, the continent could support a population many times as great as that of the present time.

New Zealand.—New Zealand is situated at the part of the Earth almost exactly opposite to the British Isles; it is often referred to as the Antipodes (the part "opposite

to the feet " of people in Britain). Hence its latitude is about the same as that of Britain and it has westerly winds throughout the year. As these winds blow to it over the ocean they bring much rain and also cause the country to have an equable temperature. Much of New Zealand is highland; in North Island there are great volcanic masses, and the Southern Alps occupy most of the western part of South Island. The highlands are mainly covered with forests, but the lowlands are fertile, and the Canterbury Plains on the east of the Southern Alps yield rich crops of grass upon which millions of sheep feed. The farmers grow much the same kind of crops as those of England, but little of the land is as yet cultivated. There is some mining, but little manufacturing, and the country is still largely undeveloped. White people of British descent form the great majority of the population, but there are also some natives, called Maoris, who belong to the Polynesian race and are of a much higher type than the aborigines of Australia. The New Zealanders, like the Australians, wish to keep their country a " White Man's Land," and so the population is very small (about one and a half millions), and increases slowly.

The Smaller Islands of the Pacific.—New Zealand may be thought of as part of a land-mass now separated from the great continental areas by the subsidence of the intervening region. Indeed, a belt of relatively shallow sea curves round the east of Australia and connects New Zealand with New Guinea, while between these areas New Caledonia rises from the shallow belt. All these islands, like those of the East Indies and of Eastern Asia, are therefore called " continental," and the rocks of which they are formed resemble those of the great land-masses.

East of these larger islands there are numerous smaller ones arranged in chains or groups which have not been

separated from continents ; they are therefore called "oceanic." These oceanic islands are formed either of volcanic or of coral rock. Disturbances in the crust of the Earth beneath the ocean have caused the outpouring of volcanic material, in some cases to such an extent that the tops of the accumulations project above the water and form steep-sided and even mountainous, but nevertheless fertile, islands.

On the slopes of these volcanic masses, just beneath the level of the warm surface water of the ocean, live coral polyps which build up their hard, bone-like framework out of the limy material they obtain from the salts of the sea-water. They form a belt of coral which reaches the surface by the addition of sand and coral fragments built up by the waves upon the living coral beneath. Thus a "fringing reef" is formed which may surround the steep volcanic island, while between the island and the coral reef is a lagoon of calm water.

The Fiji Islands are examples of this volcanic type ; the largest islands are nearly 100 miles long and are of volcanic rock with summits more than 4,000 feet high ; earthquakes, followed by great waves which overwhelm the shores, show that the disturbances still continue. The constant warmth and abundant rain clothe the slopes with dense forests. On the lower ground palms and bread-fruit and banana trees grow in great numbers ; sugar, rice, and maize are obtained in plantations, and the natives grow yams for their own food.

Besides these "high islands," there are the "low islands" or "atolls," low rings of coral reef enclosing a lagoon but without any central volcanic height. These are explained on the theory that there was once a volcanic island in that spot ; the area subsided, but so slowly that the coral polyps were able to build up on the sinking reef so that they kept in the shallow water in which alone they

can live. The reef thus kept at the same level, and when at last the volcanic island had disappeared it remained as an atoll.

A very large number of atolls exist in chains or groups in the western part of the Pacific south of the equator. They are generally surmounted by coco-nut palms, and on the fruit of the palms the small populations live, while traders visit the islands to obtain copra. The people of most of the islands belong to the Polynesian race, and the islands south of the equator are now governed either by the British or by the French, with the exception of part of the Samoan group which belongs to the United States.

North of the Equator there are fewer islands. Most of them belong to Japan ; but in mid-Pacific, just within the Tropic of Cancer, are the Hawaiian or Sandwich Islands, owned by the United States. These are volcanic ; two volcanoes, one extinct and the other still active, rise to over 13,000 feet. The population is of a very mixed character. Of the total of over a quarter of a million, 45 per cent. are Japanese and nearly 10 per cent. Chinese ; about 16 per cent. are Hawaiian or partly Hawaiian ; a small number are Filipinos, and the remainder are Europeans. Pine-apples and sugar are the chief exports of Hawaii.

Before the Great War, Germany owned a number of the Pacific Islands ; but these have now passed under mandates to the Japanese or British.

NORTH AMERICA

The People and States of North America.—Europeans visiting North America would find there more resemblances to their own continent than they would find elsewhere. This is due partly to similarities in the physical geography and partly to the fact that North America has been developed by Europeans who have cultivated land, extracted minerals, constructed railroads, and built cities in much the same way as in their own continent.

This development by Europeans is itself due partly to the similarities in the physical geography of the two areas. The explorers who followed Columbus during the sixteenth and seventeenth centuries found in the north-eastern part of the continent, lands with climates sufficiently like those of Europe for them to grow the same crops as those with which they were familiar in Europe, and for them to live in similar houses and with similar customs. In course of time, other crops were added which were native to America, *e.g.* tobacco and maize, but these were introduced to Europe and the resemblances thereby increased. The domestic animals of Europe were introduced and gradually the wild animals of North America were almost exterminated.

Another factor making possible these developments was the small number of natives, miscalled "Indians" by the early settlers and later known also as "Red Indians," another misleading name for people whose skins are of brown or yellow-brown shades. Had these

people been as numerous as those of Asia there could have been no such complete settlement of North America by Europeans. The natives were not only few in number as compared with the area of the continent ; they were relatively backward in their way of life, being for the most part nomadic hunters who lived in family groups only occasionally uniting together as tribes. Against these people even small numbers of Europeans could contend successfully, and when the white men bought or seized their hunting-grounds and organised agriculture and other occupations on European methods, the Indians were driven westward. This process gradually went on in all the temperate parts of the continent, till now there are but few Indians in the more productive parts of Canada and the United States. Only in the cold regions of Northern Canada and the arid and mountain regions of Western Canada and the United States are Indian tribes still to be found. Certain small areas are set apart for them, known as Indian reserves.

Canada.—Most of the early settlers, of whom the British, French, and Dutch were the most important, came from the cooler parts of Europe, and settled in the cooler parts of North America. At first French colonies were formed in Nova Scotia and the lower St. Lawrence valley ; in the eighteenth century these were conquered by the British, but in the province of Quebec the people still speak French and retain the Roman Catholic religion. Slowly British settlements extended up the St. Lawrence valley and at last across the continent. In 1867 the various provinces united to form the self-governing Dominion of Canada, with a capital created at Ottawa. Newfoundland did not join the Dominion of Canada and is therefore an independent colony, with the coast of Labrador dependent upon it.

The Dominion of Canada has an area of nearly 4 million square miles, almost exactly equal to that of Europe; its population is, however, very small, about 9 million people. Newfoundland has an area less than that of England and its population is about a quarter of a million.

The United States.—The population of the United States is of very mixed origin. In the early days of settlement people of several nationalities came to the central part of the continent. North-east of New York British settlers were in the majority, and the group of six states east of the Hudson Valley is still referred to as New England. In the neighbourhood of New York and the Hudson Valley there were many Dutch and German farmers and traders, but this region was later acquired by Britain and in the coast plains south-west of New York were British settlements. Thus the north-eastern coastal region came under the power of Britain, but the region around the Gulf of Mexico and the lower Mississippi Valley were occupied by the Spanish, while French traders entered the northern part of the Mississippi region from the St. Lawrence basin.

While Spain still claimed sovereignty over the lower, and France over the upper, Mississippi region, the English-speaking colonists of the eastern coastal region refused to pay taxes to the British Government and in 1776 declared their independence. They succeeded in obtaining this, and formed out of thirteen separate states the "United States of America."

During the first half of the nineteenth century, the United States purchased the lands claimed by Spain and France, and purchased or conquered the regions further west, until their territory stretched from the Atlantic to the Pacific. Still later, they purchased Alaska from the

Russians (who had reached it in fur-trading expeditions from Siberia), and towards the end of the century they annexed Hawaii. Spain still governed, or mis-governed, Cuba and Porto Rico in the West Indies ; there were revolutions, the United States intervened, and war broke out between the two countries. Spain was defeated and had to give up these islands and the Philippines. The United States paid 20 million dollars to Spain, and thus acquired Porto Rico and the Philippines, but Cuba was granted an independent government.

At the beginning of the nineteenth century the population of the United States consisted only of 4 million white people ; in 1920 there was a population of 95 million white people. This enormous increase is largely because of the constant stream of immigration from Europe. For the great part of the period the immigrants came from the British Isles and from Germany ; during the last part of the time even more came from Italy, from the subject peoples of Austria and Hungary, and from Russia.

The British immigrants had the same language as that spoken in the United States ; they lived in much the same way as the Americans, they took part in the government of the country, and so they were " assimilated " into citizenship of the United States. So were the Germans, but as they spoke a different language they tended to keep together and there are German sections in some of the big cities, while in certain towns and villages there are German names everywhere. The sons and grandsons of the Germans, however, learnt English and except for their names became practically indistinguishable from the others.

With the later comers from southern and eastern Europe, however, it was different. The poor peasants of Italy, the oppressed peoples of Austria-Hungary, the Jews and others from Russia who were both poor and

oppressed, did not so easily become good citizens. Their languages were quite different ; as a rule they were uneducated, and lacking money to buy farms, they were often obliged to become unskilled labourers. They lived together in the poorest parts of the great cities, and because at home they had had no share in the government, they were unfitted for it in their new country. Thus there came to be a large number of almost alien and unassimilated people. During the Great War immigration practically ceased, but afterwards great streams of refugees from the war-stricken countries of central and eastern Europe began to arrive. As the problem of the unassimilated peoples was likely to become difficult and the country was now fairly densely populated, the government of the United States passed laws to regulate and restrict immigration, only a certain number of people of each nationality being admitted each year.

In the southern part of the States there developed another problem of population. The settlers in the warmer parts of the country, notably in the region called the Southern Plains (marked as such in the map on p. 145), found the climate too trying for them to do much farm work themselves ; negro slaves were therefore purchased from slave traders who brought them from Africa. At the beginning of the nineteenth century, there were a million slaves in the country, and as during the century the growing of cotton became the mainstay of the southern states and this depended on slave labour, the slaves became more numerous and slavery seemed to the southern people a necessary part of their organisation.

Meanwhile in the northern states, as in England, slavery had come to be regarded as wrong ; thus a conflict between North and South began which caused the Civil War of 1861-1865. The North won and slavery was abolished, but the slaves remained as wage-earners. They

were by law admitted to citizenship and given equal rights with white people. But in practice the descendants of the slaves are not yet on an equality with white men ; in the far south they are prevented from voting, are not allowed to travel in the same railway carriages, to attend the same churches or to be taught in the same schools. The whites regard them as lower than themselves and unfit to take part in the government. They say that the whole community will be most benefited if the negroes live by themselves (except in so far as they are servants or workers for the white men), and if the negroes work well for a fair wage. The negroes resent this contemptuous treatment, and point out that many of them have succeeded in obtaining education and have become successful teachers, preachers, doctors, lawyers, and bankers for their own people. There is great difficulty, too, arising out of the bitterness felt by the landless white labourers (the " poor whites ") who find that the negroes will work at lower wages than white men. These various prejudices, hatreds, and fears have many times showed themselves in riots and horrible murders.

The solution of the problem is not yet in sight, and the negro population in the south is increasing. In 1920, it was 10½ millions, and in the belt of states from Louisiana eastward to South Carolina, about 40 per cent. of the people are " coloured."

Still another " colour problem " exists in the Pacific states, particularly in California, owing to the immigration of Chinese and Japanese. Both peoples work hard and, because they live very frugally and have a lower standard of comfort than whites, undercut white labour and save money. This money they invest in businesses and agriculture, and in the case of the Japanese scientific knowledge is added to industry. The state of California has tried to prevent the Japanese from purchasing land,

and their children from attending the schools, and this action of California has made difficulty between Japan and the government of the United States as a whole.

As the United States began by a union of colonies which were independent, and rather jealous, of one another, the constitution of the United States limits the power of the central or Federal government to certain matters, while other matters are dealt with by the various states. Hence the state of California makes its own laws about land-owning and education, but these may conflict with the general agreement which the United States as a whole makes with Japan about the admission of immigrants. In this particular matter the Californians think that the eastern states do not sufficiently sympathise with their difficulties. This gives an illustration of another problem of the United States: the reconciliation of the interests of such different communities as those of this great area. In this matter East and West do not quite agree, and it has just been shown how seriously North and South once differed.

There are now forty-eight states, in addition to territories which have not the rank of states. The government is a Republic, the head of which is a President elected every four years. Each state has its own capital, and the capital of the whole country is Washington. This city was planned to be the centre of the government and stands in a small area, the District of Columbia, which belongs to no state. Here is the "White House," the official residence of the President of the Republic.

The area of the United States, without Alaska and the outlying possessions, is about 3 million square miles, and its population in 1920 was nearly 106 millions. Alaska has an area of half a million square miles, but its population is only about 50,000 people.

Outstanding characteristics of the American people

are their energy and resourcefulness. They are very keen workers and constantly try improved methods ; this is shown particularly in the adaptation of machinery to take the place of hand labour. In the factories practically everything is done by the machines which the employees only tend ; also the work is speeded up as much as possible. The use of machinery extends almost everywhere ; even in banks coins are separated, counted, and wrapped up by one machine, while the accounts are added by another. For efficient work, the people expect a high return. The average wage is considerably higher than in any part of Europe and the standard of living is higher. People demand and obtain more comforts and conveniences in their houses, for example, and the public buildings are great and impressive. Though the wage of skilled workers is high, unskilled labour gets a considerably lower return for hard work. At the other end of the scale are the many rich men who have made their fortunes in industries, trade, or finance ; the United States shows a great contrast between the successful and the unsuccessful, a contrast most strikingly displayed between the millionaires of the great cities of the North and the poor whites of the country districts of the South.

Mexico.—The southern part of North America was conquered by the Spanish. The Spaniards did not themselves work on the fields or in the mines, whose riches had attracted them to the country, but took possession of the land and got Indians to work for them ; they also inter-married with the Indians and so there are many half-breeds. At present the population of Mexico numbers about 15 millions, of whom about 20 per cent. are of European descent, nearly 40 per cent. native Indians, and over 40 per cent. of mixed origin ; these last people are frequently described as “ Mexicans.”

The people of Mexico threw off the rule of Spain early in the nineteenth century, but in the formation of a good government they have not been so fortunate as Canada or the United States. In theory, the constitution of Mexico is rather like that of the United States, for it is a Federal Republic of a number of states and at the head is an elected President. But the people of Mexico did not have the long training in government which those of the northern countries had before they formed their own governments in America, and even now a large number of the population are backward in many ways, and some of the Indians are still in a state of savagery. Also, many even of the more educated are not law-abiding, and a recent traveller in Mexico called it "The Land of the Pistol." For these reasons, the government has been unsatisfactory, and there have been repeated insurrections and civil wars; men have made themselves "Dictators" or "Presidents" by force and then mis-used their power.

Such a state of affairs must do great harm to a country, and the advance of Mexico has been greatly retarded. For example, money has been borrowed for public purposes from Europeans, but the promised interest has not been paid upon it. This has caused trouble between the Mexican and other governments, and made American and European financiers less likely to assist developments.

Relief and Structure of North America.—In the section on Asia it was pointed out that the mountain chains of Eastern Asia are a continuation of the western highlands of North America. On both sides of the Pacific Ocean there are fold-mountains, but those of North America have not subsided as those of Asia. They form a continuous mass of high country sometimes called the Western Cordillera; only the northern part

of the western margin has been depressed sufficiently to form peninsulas and islands, and these are fewer in number than those off the Asiatic coast.

In Asia, what were high basins between still higher ranges have disappeared and are represented by the various inland seas, but in Canada and the United States these high basins still exist between the coastal ranges on the west and the Rocky Mountains on the east ; further south, in Mexico, there is a somewhat similar structure, for the high plateau is ridged on either side by greater heights. Volcanic activity, past and present, and earthquakes are characteristic of the American Cordillera as of the island chains of Asia, and minerals are found to an even greater extent in the American than in the Asiatic Region.

As on each side of the Pacific Ocean, so on each side of the Atlantic Ocean there is a similarity of structure. The broken block-mountains of central Europe find a less broken and higher counterpart in the Appalachian Highlands of eastern North America. In North America, as in Europe, these are of ancient hard rock, often flat-topped and with valuable stores of coal and iron which have given rise to great industries. The Appalachian Highlands are highest in their southern portion (Region marked S. A. in the map on p. 145), where they have been deeply cut into valleys separated by ridges. The northern part (Region marked N. A.) is broader and has been depressed ; here lowland areas border the sea. The extreme north of the system appears only as the island of Newfoundland, but great shallows in the sea (the Newfoundland Banks) show where the ancient land is only a little below sea-level.

The northern part of the continent is a relatively low region of ancient and hard rock. It lies north of the curved line formed by the lower St. Lawrence Valley,

the five "Great Lakes" (viz. Ontario, Erie, Huron, Michigan, and Superior), Lake Winnipeg, Lake Athabasca, Great Slave Lake, and Great Bear Lake. This area has been worn down by weather and streams for such an inconceivable length of time that, though composed of rock of varying hardness, it has been reduced almost to a plain; it is therefore called a peneplain and may be compared in many ways with Finland and the east of Sweden, a similar peneplain in Europe.

The whole of the north of the continent has been slowly and slightly depressed, so that the sea has not only invaded the lowest lands of the eastern, northern, and western coasts but also gained access to the lowest part of the peneplain and so formed Hudson Bay. It may be noted that Hudson Bay has a situation rather like that of the Gulf of Bothnia in Europe, while the relatively high and indented coast of Labrador corresponds with that of Norway.

South of the peneplain and between the Western Cordillera and the Appalachian Highlands, are great plains formed of sedimentary rocks.* The line of large lakes is due to the fact that here the softer sedimentary rocks adjoin the harder ancient rocks, and the weather and streams have worn down the softer rocks more than the harder ones. Thus a wide and very long hollow was formed, in parts of which water has accumulated for a reason explained later.

The ground formed of sedimentary rocks rises gradually from this hollow southward and westward. In the south it soon becomes lower again and the water drains southward by the Mississippi and its tributaries to the Gulf of Mexico. In the west it rises steadily higher and forms the "High Plains" (see the map of Natural

* For the explanation of this term, see "Europe of To-day," p. 97.

Regions) which reach an elevation of over 3,000 feet before they are ended by the Rocky Mountains.

The sedimentary rock of the lower plains (marked Northern, Central, and Southern Plains on the map of Natural Regions) weathers to a fertile soil, and the region of the Southern Plains is continued north-eastward between the Southern Appalachians and the Atlantic Ocean.

The Glaciation of North America.—The resemblances between North America and Europe are increased by the fact that in the Ice Age, the northern parts of both continents were glaciated in the way described in the book upon Europe.

The ice-sheet spread from the north of North America about as far south as a line drawn eastward from New York across the Appalachians to the upper Ohio, down the Ohio valley to near its junction with the Mississippi, up the valley of the Missouri, and then westward from the source of the Missouri across the Cordillera south of the Canadian boundary to Puget Sound.

Within this line the ancient peneplain shows the greatest effect of the ice. Its soil, like that of Finland, has been removed, and the hard surface of the rock is diversified by boulders or patches of boulder clay, while in parts it has been covered by lakes or marshes.

The long hollow upon the southern margin of the peneplain was strewn with morainic material and many of the large lakes are the result. The water that gathered on the edge of the melting ice escaped by enormous rivers southward or eastward to the ocean. The scourings of such rivers were an important factor in producing the Great Lakes, and the Niagara Falls between Lakes Erie and Ontario. For a time the melted ice-water poured eastward from the region of Lake Ontario, first

skirting the northern edge of the South Appalachian Highland, and then turning sharply southward through the valley which separates the southern and northern parts of the Appalachian system. The first part of this course is now a wide valley in which the Mohawk River flows ; the second part is the lower valley of the Hudson River. The sharp turn occurred where the Mohawk joins the Hudson at the town of Albany. Thus a very wide valley was formed by the ancient river, and an easy route was provided across the Appalachians. The drowning of the coastal region allowed the sea-water to penetrate the lower part of the valley, so that great vessels can enter it. At the Atlantic entrance to this deep and wide waterway has grown up New York, the greatest port of North America.*

South of the line of lakes, glaciation has had more beneficial effects than in the northern region. It is longer since the ice covered this area and the lakes and marshes have almost disappeared ; indeed, some of the best agricultural lands are where old lakes have entirely gone and the fertile soils in their beds are now exposed and cultivated. Moreover, much soil from the north has been deposited here, and when the boulders have been removed, the rich mixture of clays and sands amply repays the farmers for their work.

Still further south, beyond the limits of the ice-sheet, only the finer glacial material was spread out by the rivers and now forms a fertile soil, while some areas are covered with loess like that of central and eastern Europe.

The Climates of North America.—The climates of North America are somewhat like those of the other

* The resemblance between the origin of the Elbe and the situation of Hamburg in Europe with the origin of the Hudson and the situation of New York in America should not be overlooked.

great land-mass north of the equator, namely, that composed of Europe, Asia, and North Africa. The conditions along the western part of North America correspond with those of Europe and North Africa to 10° N., that is, as far south as North America reaches ; those of the central and eastern part of North America may be compared with those of Asia.

In the part of the Old World now considered, there are four climate regions along the western coast. First, there is north-west Europe, with its equable climate and rain at all seasons ; with this may be compared the North-west Coastal Region of North America (see the map on p. 145). Second, there is the Mediterranean region of winter rains ; the corresponding region in America is California. Next, there is the Sahara desert region ; the American continent has a smaller but broadly comparable South-west Desert Region. Last, there is the Sudan region of heat and summer rain ; the Central American Region is somewhat like this, but as there is sea on both sides of it, the cooler part of the year is not as dry as in the African region. These four pairs of regions may be thought of as occurring in a belt system, for the characteristics of their climate are due to the northward and southward swing of the wind belts.

The central and eastern regions of North America have climates due to a modified monsoon system ; this is less marked than that of Asia because the extent of land in America which lies near the tropic, and is therefore greatly heated in the summer, is less than that in Asia.

There is a certain in-draught of air from the Gulf of Mexico in the summer, and this brings much moisture to the south-east of the North American continent ; there is less rainfall on the plains of the interior as the distance from the Atlantic increases. In winter there is a fair

amount of rain in the regions near the Atlantic coast, because all the northern part of the continent is traversed by cyclones, and these draw in moisture from the ocean which is precipitated in the east of the United States and of Canada. The central and eastern regions may be broadly compared with those of Asia in so far as they have most of their rainfall in summer, while the summer and winter temperatures of the two continents are similar. In the northern parts of both continents the winters are very cold and long.

Off Labrador and Newfoundland, as off Northern Japan, a cold current drifts southward, causing the climate to be more inclement than it would otherwise be. The cold Labrador current meets the Gulf Stream Drift off Newfoundland, and cools the moisture-laden air above the Drift, thus forming the fogs of the Newfoundland Banks.

The mountain regions of the Cordillera are of course colder according to their elevation : the ridges have rain but the enclosed basins are relatively dry.

Corresponding with the similarities of climate between the two great land-masses are similarities in the vegetation; this can be best described when dealing in turn with each of the natural regions.

The Northern Appalachian Region.—The Pilgrim Fathers landed in the southern part of this region and named it New England. Parts of the country, for example the lowlands around Boston Bay, are fairly fertile and these were first settled, but much of the ground is stubborn and harvests are rather poor. Often the farmers had to collect the glacial boulders from the land and stack them up like thick walls between the fields. People here grow much the same crops as those of Britain, as the summer temperatures are similar although the winters are much colder. When the low-

lands had been occupied new settlers went to the uplands, but after roads and railroads were made into the more fertile Central Plains, the upland farms were abandoned, and now these parts of New England have a deserted and desolate appearance. The northernmost of the six states,* Maine, is little farmed, but lumbering is carried on in its extensive forests. Fishing is another occupation in these states, for the Newfoundland Banks, where great quantities of cod are obtained, are near.

The greater part of the population of New England is dependent, directly or indirectly, on the manufactures of the region, for this is one of the great manufacturing districts of the world. It is a marked exception to the general rule that industries are concentrated upon coal-fields, for no coal is found in New England. Further, neither iron nor other metals are mined, no cotton is grown, and but little wool and leather are obtained locally; yet New England is famous for the manufacture of goods made from these materials.

The reason is because the industries began when the European settlers lived only along the coastal districts here and further south; they were very far from the manufacturing districts of their home countries and so made many things for their own use. This was before the days of steam-power, so that coal was not required, but people did then know how to use water-power to turn wheels for spinning and weaving and for working the heavy hammers in the iron industry. The glaciation of New England caused a considerable number of waterfalls in the streams, and many of these were situated near the settlements by the coast. Enough wool and leather were to be had for their needs at that time, and the oak-bark from the forests gave material for tanning the leather.

* The names and exact positions of these and the other states can be obtained from the atlas.

Also, the goods were made where they were required by many settlers, and the surplus could easily be sent further south by the coasting vessels which were then the chief means of communication between the various colonies.

For these reasons the industries grew up in a small way and the men of New England, sometimes called "Yankees," were unusually hard-working, enterprising, and ingenious in devising new machinery and making improvements of all kinds. Therefore more and more water-power was used, and in recent years it has been employed to produce electricity, and the machines are now electrically driven. When steam-engines were invented, coal was brought from the South Appalachian region to supplement the water-power, and when the use of cotton became common and cotton was grown in the southern states, it was brought for manufacture to the region where there were men skilled in spinning and weaving, as negro labour was too inefficient for this work. As the population of the United States grew so did these industries, for their goods, well made and well known, were sent to all parts of the country; even in England we buy some of them, for example, Waterbury and Waltham watches which are named after the two towns of New England where they are made. It may be noted that since raw materials have to be imported, the goods made in New England are mainly those which use little material; they need great skill in making and are valuable enough (compared with their weight and bulk) to pay for export.

The Americans are proud of the size of their cities, factories and other works; hence one finds in American books statements like these: "The Merrimack River turns more spindles than any river in the world. . . . Atholl, in the State of Massachusetts, contains the largest concern in the world for making fine tools. . . .

Hartford, in Connecticut, has the largest typewriter company. . . . Between fifteen and twenty miles of cotton cloth are made each minute in New England factories. . . . The largest cotton-manufacturing establishment in the world is located in Manchester, New Hampshire, and the largest woolen-manufacturing * company in the world has more than thirty different mills in New England cities. . . . The variety of metal manufactures made in New England seems almost endless ; if you would like to weigh either a locomotive or a postage stamp go to St. Johnsbury and Rutland, Vermont, where more scales are made than anywhere in the world.” And so on.

Boston is the “metropolis” and the great port of New England ; it is a city of three-quarters of a million people, situated in the centre of the densely populated part of the region, and its commerce is facilitated by an excellent harbour. Yet it has only a small fraction of the trade of New York, for it is shut off from the interior of the United States by the mountains which run from north to south through the west of New England ; the railway which connects Boston with Albany has to pass through a tunnel five miles long. In this way, New England is somewhat isolated from the remainder of the United States.

North of this district are the Maritime Provinces of Canada. The chief industries here are farming and lumbering, but coal and iron are found in Nova Scotia, by means of which some iron and steel manufacturing is carried on in the north of that province. As the St. Lawrence estuary is frozen over in winter, some of the Canadian trade is then sent by way of Halifax, in Nova Scotia, which is ice-free throughout the year.

* Note that the spelling is somewhat different from that employed in England ; slight differences of this kind are often found in American books.

The valley of the St. Lawrence between the Great Lakes and Quebec has farming of the same kind as that of New England, for it is largely concerned with the keeping of cattle, but unlike New England the valley forms an important route for commerce. Montreal, the largest city of Canada, is at the head of ocean navigation on the St. Lawrence, and below it is the rival port of Quebec; on the Ottawa River, which enters the St. Lawrence by Montreal, is Ottawa, the capital of the Dominion.

Newfoundland is too cold for much farming, and its wealth consists in the forests (from the wood of which much paper is made), the iron-mines, and the fisheries which lie off its shores.

The Mohawk-Hudson Valley.—This narrow lowland separates the two Appalachian regions. It is a fertile farming area, but its predominating importance is that it provides the easiest route between the densely populated central region of the United States on the one hand, and on the other the Atlantic Ocean and Europe. The Hudson River is navigable to beyond Albany, and thence the Erie Canal takes traffic to Lake Erie and so to the extensive system of inland communication provided by the Great Lakes. Traffic goes through these valleys to some extent by road and to some extent by water, but by far the greater amount goes by the railways which take advantage of the almost level passage. At the west end of the valley is the lake port, Buffalo; at the Atlantic end is New York.

In addition to its position on this route, New York has a great advantage in its fine harbour, due to the drowning of the region. Close to the mouth of the Hudson River is Long Island separated from New York by the narrow strait known as East River; New York is

built on the narrow peninsula of land between the Hudson River and East River, and therefore has two water frontages for the wharves for ships. Because New York was thus enclosed, the growth of its trade led to the crowding of its business premises and then to the erection of very high buildings commonly called "sky-scrapers." Many of these have twenty or thirty stories and one of them has fifty-one floors of offices. Lifts must replace staircases in such buildings; in the high ones there are express lifts which do not stop till they reach the higher stories, as well as others which stop at the intermediate floors.

New York has now spread far beyond the narrow district between the rivers, and Brooklyn has grown up on Long Island, joined to the central part of the city by the huge and famous Brooklyn suspension bridge, as well as by sub-ways beneath East River and ferries across it.

Besides being the "commercial capital" of the United States, New York is one of the greatest banking and financial centres of the world; also it has many manufactures, particularly of clothing.* As an example of the development of the use of machinery, it may be mentioned that 100 suits of clothes are cut out at a time by pressing 100 layers of cloth together flat upon a bench and cutting downward through them by a small electrically-driven cutter guided by the tailor.

The Borough of New York has a population of about 6,000,000, but to this must be added a very large number of people who live in what is really the same great centre but are under a different city government. For example, on the west bank of the Hudson are Jersey City and

* In this, as in its other developments, New York may be compared with London. See the discussion of the reasons for the growth of London in "British Isles of To-day," pp. 64-68.

Newark, in the State of New Jersey, which together have a population of three-quarters of a million people.

Along the Mohawk valley are a considerable number of smaller manufacturing towns, and while some of these use machines driven by steam-power, others depend upon electric current transmitted by cables from the great power-stations at Niagara Falls at the western end of the valley. Such easy transmission of power, as compared with the sending of coal in trucks, is possible up to a distance of 400 miles.

The Southern Appalachian Region. — Overlooking the Mohawk Valley from the north are the Adirondack Mountains, a densely forested highland district which is a summer resort for the people of the neighbouring states. Opposite to this on the southern side of the valley is the edge of the Southern Appalachian region, known as the Catskill Hills, the scene of the legend of Rip Van Winkle. This also is a forested upland, but the rivers have cut valleys which are floored with fertile soil and consequently are studded with farms.

Two of the rivers which flow across the Appalachian upland to the Atlantic are the Delaware, whose lower course has been drowned and forms Delaware Bay, and the Susquehanna, which flows into the corresponding inlet called Chesapeake Bay. Through the valleys of these rivers routes cross the upland to the interior, and by their estuaries are large ports: Philadelphia by the Delaware, and Baltimore by the Susquehanna. Because the routes are not as easy as that of the Hudson these cities have not become as great as New York, but Philadelphia is the third city in the States, with nearly two million people, and Baltimore is about as large as Boston.

The importance of these cities is increased by the fact that in the valleys which lead towards them are coalfields.

Very valuable deposits of anthracite are obtained from Scranton and Wilkesbarre in the upper basin of the Susquehanna.

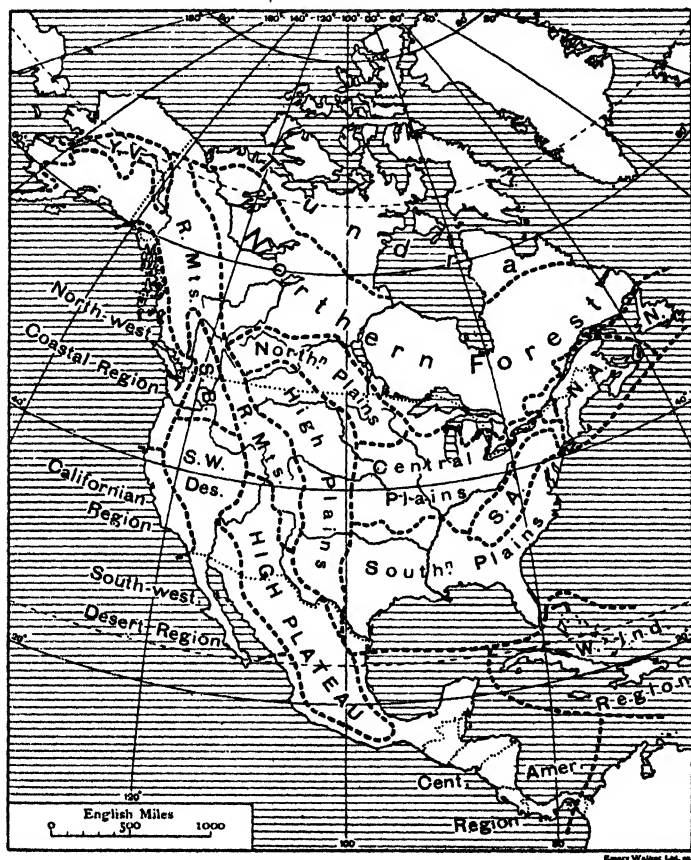


FIG. 8.—Natural Regions of North America.

The western side of this plateau-like region dips gently westward to the Central Plains, and is drained by the tributaries of the Ohio. Here again coal is found,

and as iron ore, oil and natural gas were also obtained, industries grew up in the district, centred at Pittsburgh, where the waters of the upper Ohio River come together and leave the upland. South and south-west of Pittsburgh extends the great coalfield, in which far more coal is worked than in any other coalfield in the world. Great iron and steel works have been developed at this city, and now that the Appalachian ores are no longer obtained, the iron ore is brought from the shores of Lake Superior by water to the neighbouring shores of Lake Erie and thence transported by canal and railway to Pittsburgh to be smelted with the help of the Appalachian coal. Other industries have also developed ; for example, while men's labour is needed for the mining and the iron and steel working, women's labour is employed in silk and other textile mills. The following passage gives a view of Pittsburgh as seen from the higher ground above the Ohio valley :

“ Looked at from the hill of the University, Pittsburgh presents itself, behind its veil of drifting smoke, as a vast community of scattered houses, stretching over as many hills as Rome itself. The little reddish houses, so curiously independent of one another, peep out from between the trees, which spread everywhere, covering hill and valley. The great steel works belch below in the valley. But the little Ford motors now owned by the great majority of the workmen enable them to get away from the smoke into the open country. No one can say whether that is ‘ going out ’ of Pittsburgh. For Pittsburgh sprawls everywhere. There is plenty of room, and consequently heaps of playgrounds for the children, besides an absurdly cheap public golf course for the young men and women. . . . The housing of the middle-classes is admirable—sweet, open villas, with wide verandahs—and palaces for the rich. But the housing

of the working-class—often only little crowded wooden shacks shut in from light and air by larger buildings—is bad. Housing is the worst blot on Pittsburgh as on so many American cities.”

The state of New York extends from the Atlantic Ocean to the shores of Lakes Erie and Ontario, and it is mainly because it includes the Hudson-Mohawk Valley and New York City that it ranks first among the states in respect of population and the value of the goods produced. Not far behind in both respects comes the state of Pennsylvania which lies to the south of it and extends across the Appalachian system, including Philadelphia, a large part of the great coalfields, and Pittsburgh.

South of Pennsylvania the Appalachian system is sometimes called the Allegheny Mountains. It consists of three parts: (1) a range of mountains on the east overlooking the Atlantic coast plain; this range is the Blue Ridge, and it rises to a height of over 6,000 feet. (2) A series of fairly wide valleys separated by narrow ridges; the valleys are fertile farming districts drained by long rivers, such as the Tennessee tributary of the Mississippi and the Alabama River which flows southward to the Gulf of Mexico. (3) A plateau, known as the Cumberland or Allegheny Plateau, which has a steep escarpment overlooking these valleys on the east but dips gently to the Central Plains on the west.

Beneath the soil of the Allegheny Plateau are great stores of coal; they are a continuation of the deposits found in the northern plateau near Pittsburgh, and they are worked on a large scale in the southern extremity of the Appalachian region. Here iron and limestone are also obtained, and hence great steel works have been set up at Birmingham and Bessemer in Alabama and at other places on the margin of the Appalachian Region.

Water-power is also obtained from the mountains, and manufactures of several kinds have been established.

Among these manufactures, that of cotton goods is by far the most important. It is carried on at Birmingham and many other places near the junction between the Appalachian uplands which provide the power and the Southern Plains where the cotton is obtained. The manufacturing of cotton goods is increasing here more rapidly than in New England ; every year more of the cotton grown in this region is retained for use in the neighbouring mills instead of being sent northward or to England, and already a great amount of goods of cheaper quality is exported to China and to tropical lands.

The Southern Plains.—The climate of this region may be compared with that of Central China, and the products are to a certain extent the same. Cotton, sugar, and rice are grown in both regions, but in America no silk or opium is produced ; on the other hand, from the more northerly parts of the Southern Plains much maize and tobacco are obtained. The sugar cane is grown on the hot and swampy Mississippi delta. Rice is grown in the same district and on either side of it on the lowlands adjoining the Gulf of Mexico ; much of the work done so laboriously by hand in Asia, is done in America by machines. Tobacco is obtained from the States of Virginia and North Carolina, and in the same districts there is a large production of vegetables which are sent northward to the great commercial and manufacturing cities of the Atlantic coast.

Although these products of the Southern Plains are important, their importance is overshadowed by that of cotton. This region produces more than half the total cotton crop of the world. The cotton is grown to some extent over the whole region, except the peninsula of

Florida and the north-eastern extremity near Philadelphia, so that the region with the exclusion of these two districts is often called the Cotton Belt.

This is the land of the negroes, who do most of the actual work of cotton-growing, picking, packing, etc. Some of them own or rent a small patch of land, others are labourers on the larger estates of the white farmers and landowners. Except on the small farms machines are used for preparing the ground and seeding, but the work of picking the fluffy cotton-bolls from the shrub-like plants has to be done by hand, and as the plants in the same field ripen at different times, the picking extends over a considerable period. Consequently much labour is required, and in several parts of the world only the lack of sufficiently cheap labour prevents cultivation on a large scale.

After it is picked, the cotton has to be separated from the seeds attached to it in the bolls ; this work is done by a machine called the cotton-gin. Until this machine was invented, even more labour was required to clean than to pick the cotton, and it was not till after the invention of the cotton-gin in 1792 that the United States grew any appreciable amount of cotton or that cotton came into common use in temperate lands.

The seeds thus obtained are an important by-product, for they are pressed to obtain an oil used in the manufacture of margarine and lard, as a substitute for olive oil, as a lubricant for machines, and for other purposes, while the remaining oil-cake is a nourishing food for cattle.

The best cotton is that with long fibres, *i.e.* long-staple cotton, known as Sea Island cotton because it was first obtained from islands off the coasts of Georgia and South Carolina. Far greater amounts of the upland, or short-staple, cotton are obtained, and the state which ranks first in the total production is Texas. The Texan

cotton is mainly exported from Galveston, that of the central part of the region from New Orleans and Mobile, that of the east from Charleston and Savannah.

Great trouble in the Cotton Belt has been caused by the boll-weevil, a little beetle which eats into the bolls and destroys the crop. It is sometimes called the Mexican weevil because it came from that country ; it entered Texas at the end of the nineteenth century, and year by year spread eastward till in 1921 it had extended over the whole of the region. In that year it caused a loss estimated at 6 million bales while the actual harvest was 12 million bales, and the total loss since the boll-weevil appeared is to be valued in thousands of millions of dollars.* In spite of all efforts, no effective remedy is yet found. One result of the pest is that the farmers who used to grow nothing but cotton and to buy almost everything they needed from other districts, now grow a much greater variety of crops and also keep more animals than before.

Another product of the Southern states is timber, obtained from the sandy lands with too poor a soil for cotton, or from the wetter and swampy parts. Pines from the former, and cypresses from the latter, as well as oaks from heavy clay soils, are cut in great numbers, and the ports of the lower Mississippi are among the chief lumber ports of the world.

Texas is important for its enormous production of petroleum, obtained in the centre of the state and therefore just on the edge of the Southern Plains. .

Two districts are less productive than most of the region : one is the low, swampy and repeatedly flooded valley lying immediately on either side of the lower Mississippi ; the other is the low, swampy peninsula of Florida, with its hot, wet climate. The drier northern

* A bale is 500 lbs. ; a dollar is normally worth 4s. 2d.

part of Florida has orchards, and orange-growing is one of the main resources of the state, but the southern part is an uninhabitable swamp with many areas permanently under water.

The towns of the north-east part of the Southern Plains region are arranged in an interesting manner. One set are ports which are at or near the mouths of the rivers, from Norfolk southward to Savannah. The other set are inland where the river navigation is stopped by falls. There is a line of such towns : Philadelphia, by the falls of the Schuylkill tributary of the Delaware ; Baltimore, by a smaller tributary of the Susquehanna ; Washington, on the Potomac ; Richmond, on the James ; Raleigh, Columbia, and Augusta. This line is called the Fall Line ; it is situated where the rivers leave the hard rock which descends gently from the Appalachians and flow across the soft layers of the coastal plain. Along this line all the streams have cut down into the softer earth and formed falls ; these falls check navigation and so lead to the unloading of boats and also provide power for manufacturing. Hence the towns of the Fall Line (except Washington) have both commerce and industries.

In the western part of the region the chief towns are on the coast of the Gulf of Mexico or at the edge of the flood-plain of the Mississippi. New Orleans is by far the largest ; it is the port of entry and exit for the lower Mississippi Basin.

The Central Plains.—This region, together with the part of the Northern Plains that is included in the United States, is often referred to as the Middle West. It is a densely populated region of fertile fields and also of industrial and commercial cities. It is sometimes called the Grain Belt, or the Maize Belt, for agriculture and particularly the growing of maize is the basis of much of

its prosperity. Its climate is like that of Manchuria, for the July temperatures are fairly high, between 70° and 80° F., but the winters are cold, most of the region having a mean January temperature below freezing-point.

The rainfall is mainly in summer, and greater in the east than the west. These conditions favoured the growth of grass, and until the region was cultivated it was a prairie-land ; even yet some of the states are sometimes called the Prairie states.

Now thorough and scientific agriculture has transformed the country and the glacial soils are very productive. The summer rains and heat particularly favour the growth of maize, wheat and oats being grown to a less extent ; tobacco is obtained near the Appalachian region in the states of Kentucky and Tennessee ; fruits, too, are widely grown in the better-watered eastern portion, while much hay is obtained everywhere and is particularly important to the farmers in the western area.

Over the whole region a very large number of animals are reared ; cattle and pigs, commonly called hogs, are kept here to a greater extent than elsewhere in the United States. This is partly because they are fed or fattened upon the maize, and partly because a great industry has grown up which uses them as its "raw material." The packing industry aims principally at obtaining meat in various forms which is sent away packed in tins, but the factories use all parts of the animals : the hides are used to make leather and leather goods, the bones to make handles for brushes and cutlery, buttons, etc. ; it has been a boast of the packing firms that they use "everything of the hog except the squeal."

The packing and associated industries have many products and require much raw material besides that obtained from the animals : hence other manufactures, especially of metal goods, exist in the region and are

centred in the great packing cities. Among the most important of these cities are Chicago in Illinois, St. Louis in Missouri, Cincinnati in Ohio, Indianapolis in Indiana, Omaha in Nebraska, and Kansas City.

Another requirement of the packing industry is coal, as practically all the work is carried on by machinery. The coal is easily obtained, for besides that of the western Appalachian region, other fields lie beneath the prairies, much coal being mined in the district south of Chicago.

The coal is used for the other great industry of the Central Plains, namely, making iron and steel goods of all kinds. The greatest source of iron ore in the world is just outside this region on the south-western and southern shores of Lake Superior. Here the ore comes to the surface and there are actual mountains and ridges of it. It is obtained on a very large scale : steam shovels scrape it out and dump it into railway trucks, which run on piers by the lake-side, and tip it into specially constructed ships. These take it to the ports on the lower Great Lakes, where it is again dealt with in bulk. Because of the efficient methods and because carriage by water is cheap, the lake ports can obtain the ore at a low price ; they get coal from the inland coalfields, and as their market for the iron and steel is close at hand they are in a very favourable position as manufacturing centres.

Hence great steel works have grown up at Chicago and Milwaukee on Lake Michigan, and Cleveland, Buffalo, and other ports on Lake Erie. East of Chicago, at the southern extremity of Lake Michigan, the city of Gary has been established by the biggest steel company in the States and planned with great care for the centre of their production. Between Lakes Huron and Erie is the Detroit River, by which is the city of Detroit. Owing to the development of its motor-car industry Detroit has grown with great rapidity till it is now the

fourth city of the States, with a million inhabitants ; here are the enormous and wonderfully organised works where the Ford motor cars are made. Toledo, not far away at the western end of Lake Erie, has shared in the development of this branch of the steel industry. Many of the cities of the plains have similarly grown by specialising in their production, and over the whole region is a network of railways and electric car tracks uniting the towns, and binding the rural and urban districts into one complicated economic unit.

By far the largest city is Chicago, which has nearly three million inhabitants, and comes next to New York in size. In its commerce and its huge sky-scrapers it resembles New York ; it is situated where the great waterway of the lakes penetrates furthest into this busy region, and where the many lines of land traffic from the north-east part of the States come together to pass round the lake and continue to the north-west. A map shows how railways radiate from it on the land side, but they do not give any idea of the great amount of traffic that goes by water.

The traffic on the Great Lakes is enormous. From the western end of Lake Superior comes not only the iron ore but also great quantities of wheat from the Northern Plains region, and other ores and grains ; in return the west receives coal and manufactured goods. The eastward traffic passes through the Sault Ste. Marie or " Soo " canals, to reach the lower lakes, where the products interchanged between the ports are more various than on Lake Superior. Much of the grain is exported to Europe, going either to New York or by the St. Lawrence route to Montreal, the chief port of Canada, where transshipment to ocean liners takes place.

It should be noted that the Central Plains region extends into Canada by the St. Lawrence valley. One

of the most densely populated parts of the Dominion is here, in the fertile "Lake Peninsula" between Lakes Ontario, Erie, and Huron.

In the extreme south of the Central Plains, in the angle formed by the junction of the Missouri and the lower Mississippi, is a district which forms an exception to the rest of the region. It is the rugged Ozark Plateau, formed of hard rocks which project through the softer layers of the plain. It is forested and has deposits of iron, lead, and zinc. Until recently, many of the settlers were isolated in their valleys from the rest of the country and lived in a rather primitive fashion, but now it has been developed and fruit and other cultivated products are exported.

The Northern Plains.—This might be called the Wheat Belt, for that is by far the most important product. It is a region of great expanses of almost level country, rising by gentle gradients or an occasional terrace towards the west till it ends at the foothills of the Rocky Mountains. Most of it drains to Lake Winnipeg, the Red River flowing northward through the United States portion of the area, the Saskatchewan flowing eastward in the Canadian portion. Some of the most fertile ground is that south and west of Lake Winnipeg which was the site of a large glacial lake.

The climate is much like that of the Asiatic steppes; the temperature and rainfall conditions are shown in the graph for Regina in Fig. 9 (p. 156). The short prairie-grass has now largely disappeared, and its place has been taken by enormous crops of wheat and oats and smaller ones of barley and flax, or by fields of grass cut for hay. Many animals are kept; the winter is so cold that they are then kept in barns and fed on the hay or grain, in order that in the period before the corn harvest the farmers

may have milk, butter and cheese to send to the densely populated areas of the eastern regions. This region of wheat and dairy produce constitutes the most important part of the states of Minnesota and North and South Dakota, and of the "Prairie provinces" viz. Manitoba, Saskatchewan, and Alberta, in Canada.

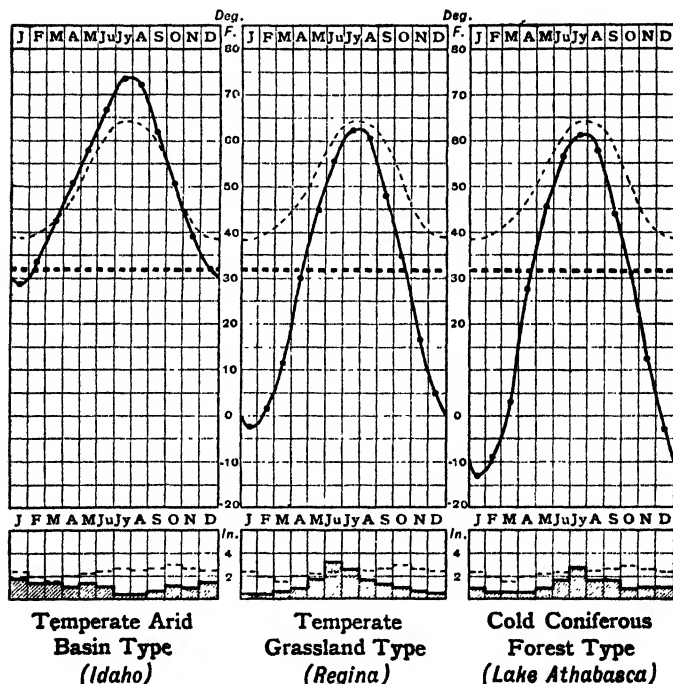


FIG. 9.—Climate Types in North America

The wheat is sent out partly by the Great Lakes, as stated above, and partly by railway; just within the eastern boundary of the region are the two commercial centres through which this traffic passes. One of these centres is in the United States; it is formed by the twin

cities St. Paul and Minneapolis on the Upper Mississippi, and in the latter city much wheat is milled by water-power obtained from falls in the river.

In Canada is the larger centre, Winnipeg, situated in the narrow piece of country between Lake Winnipeg and the American frontier and therefore at a point where all the Canadian traffic converges to go eastward.

The High Plains.—In the United States, there is a gradual increase of height as one goes westward from the Mississippi and also a gradual decrease in rainfall. At about longitude 100° W., the elevation increases to over 2,000 feet and the rainfall decreases to less than 20 inches ; here begins the region of the high and semi-arid plains, where agriculture is very restricted and the grazing of cattle and sheep is the chief resource of the few inhabitants.

The grass is not like the smooth turf of the prairies, but grows in tufts with bare soil between ; it is called bunch grass ; it is sparse in the drier areas, but luxuriant in the better-watered valleys. This bunch grass supports the animals in summer, but in winter they have to be fed. Much of the country is very level and it has a monotonous appearance. The farms, called " ranches," are often of great extent ; they are worked by " cow-boys " who look after the cattle and others who look after the sheep.

The rivers of the region, such as the Missouri, Platte, and Arkansas tributaries of the Mississippi, bring water from the Rocky Mountains which is now used in several parts for irrigation. With this help, alfalfa grass is grown as winter food for the animals, and the farmers raise vegetables and sugar-beet for their own use.

The Black Hills rise above the plains in South Dakota ; they are named from the dark forests which cover them

and they are mined for some gold and silver. Near the Black Hills are the "Bad Lands" formed of a very finely divided soil, and as the dry climate allows little vegetation to bind this together, it is cut up by the intermittent streams into an extremely irregular surface.

At the western edge of the plains, where they meet the Rocky Mountains, are settlements which act as trading centres for the exchange of the minerals of the mountain regions and the foodstuffs and clothing obtained in the High and Central Plains. Denver is the largest of these settlements, and at it are smelted the ores which are brought from the mountains on the west. The smelting is done by means of coal which is found under the High Plains but as yet worked only to a small extent.

Northern Canada, Greenland, and Alaska.—The climate of the Northern Forest region is shown by the graphs for Lake Athabasca on p. 156, and the climate, the forest, and the life of the people may be broadly compared with those of Siberia. The tundra region of America also resembles that of Asia in most ways, but the life of the people is different in that the American Esquimo have only just begun to keep reindeer, which have been imported from Asia; the Esquimo are for the most part merely hunters and fishers.

In the far north-east is Greenland, a huge plateau almost completely buried under a mass of ice. The ice accumulates by snowfall in the interior, and works its way outward, breaking off as icebergs when it reaches the sea. The coasts are mainly high, rocky, and indented, resembling those of Norway. At suitable parts of the coast tribes of Eskimo live, and there are some small Danish settlements, for Greenland is a Danish possession.

The northern part of Alaska is tundra land; the

southern part is highland and may be thought of as a continuation of the Rocky Mountains, the lower slopes forested but the upper parts covered with snowfields and glaciers. In the centre of the country is the valley of the Yukon River ; with the exception of the southern islands, this valley is the only district in which any large settlements exist, and in the summer the river is the great highway of the country. The great attraction, and at present the chief resource, of Alaska is the gold found in the Yukon valley.

The Rocky Mountains.—The Rocky Mountains form the north-eastern portion of the Cordillera ; coastal ranges in British Columbia and the United States form the north-western portion ; in the interior, between these highland masses are high basins. The northern basin is semi-arid (it is the region marked " S.B." in the map of the natural regions) ; the southern one is much drier and may be called the South-western Desert Region. The southern extremity of the Cordillera is formed by the High Plateau, whose greater portion is in Mexico.

The Rocky Mountains consist of a number of chains and ridges, with a complicated relief. Many summits rise above 10,000 feet, and the passes that are now used by railroads have an average elevation of between 5,000 and 6,000 feet.

Over their greater extent the mountains are forested, largely with coniferous trees ; in the United States the summits rise high above the tree-line though most of them are snowclad only in winter, while in the colder latitudes of Canada there are many great snowfields and even long glaciers. Almost in the centre of the United States portion of the Rockies, a large area has been reserved as a public possession ; it forms the Yellowstone Park. Through the Park flows the Yellowstone River with its

wonderful falls and the cañon, or great gorge, which they have cut during many centuries.

“ The great falls of the Yellowstone are indeed a noble sight. The water, like that of Niagara, is perfectly clear and free from sediment, issuing as it does from a great lake in which all suspended matter has been retained. It has a delicate sea-green hue which contrasts delightfully with the warm tints of the surrounding precipices, while the great height of the fall appears magnified and ennobled by the dense volumes of spray which wrap round and quite conceal the base of the watery column.

“ The Grand Cañon of the Yellowstone, however, surpasses in beauty anything else in the Park, and indeed few more striking and fascinating specimens of rock-colouring and sculpture have ever been described by travellers in the New World or the Old. At the falls the depth of the gorge is about 700 feet, but the depths increase to 1000 feet 5 miles lower down ; the height of the cañon wall nowhere exceeds some 1,500 feet, while the mouth of the chasm varies from a quarter to three-quarters of a mile in width. It is not, however, the dimensions, which are in no way remarkable, but the wonderful colours and sculpturing that give to the cañon its peculiar interest. It has been gouged by the river out of a thick mass of pale yellow or pinkish rhyolite of the plateau, which has become softened and disintegrated by the action of the hot springs and fumaroles, many of which are still to be seen steaming along its walls. . . .

“ The whole gorge is moreover painted in the most brilliant hues, from pale lemon or sulphur-yellow, which predominates, to deep orange streaked with warm vermilion, crimson, and purple, which, mingling with the deep green of the pines that close the brink of the chasm and are dotted over its rugged walls, make up together a picture of transcendent beauty and magnificence.” *

* H. M. Cadell, in the *Scottish Geographical Magazine*.

In the Yellowstone Park are also the Mammoth Hot Springs which have formed a brilliantly coloured deposit, described as looking like a vast petrified cascade, and many geysers through which boiling water is forced up through funnel-shaped openings in the Earth's crust. These indicate that the mountain-forming forces have almost died out, and the extinct volcanoes of the Rocky Mountains confirm this conclusion.

Gold, silver, copper, and lead are obtained from the Rocky Mountains both in Canada and in the United States. but in many places the deposits have been exhausted, and ruined workings and dilapidated buildings show where mining villages and even towns once flourished.

The North-west Coastal Region.—The northern part of the Rocky Mountains bends westward towards the coastal ranges of the Pacific. This region has been drowned so that the westernmost ridges appear only as a chain of islands, including Queen Charlotte Islands and Vancouver. South of the Canadian boundary the subsidence of the land has been less, and the southward continuation of the channel between Vancouver and the mainland appears as a lowland around Puget Sound; south of this again, between the Coast Range and the mountains behind, is a valley in which flows a tributary of the Columbia River. Thus in the Canadian province of British Columbia there is very little lowland, and for the most part the heights descend sheer to the sea, but in the states of Washington and Oregon there are greater areas of habitable and fertile land.

The climate of the whole region is like that of North-western Europe, equable and rainy, for it is in the belt of westerly winds and cyclones. The agricultural productions are those of the European region, and in particular

much fruit is grown : apples, pears, plums, cherries, strawberries, and raspberries are sent away, large quantities being preserved in tins. The fisheries of this drowned coast are valuable, and salmon are tinned and exported in great numbers. The mountain slopes are densely forested with coniferous trees, and pines, firs and cedars grow to giant size ; where transport to the sea is easy the trees are cut down and lumbering is an important resource of this region.

The sheltered bays make excellent harbours, and there is a group of ports of which the chief are Vancouver at the mouth of the Fraser River in British Columbia, Seattle and Tacoma on Puget Sound in Washington, and Portland on the Columbia River in Oregon. These are the termini of the transcontinental routes of the south of Canada and the north of the United States. Further north, another trans-continental route ends at Prince Rupert, in a less populated district.*

The Semi-Arid Basin. — Between the North-west Coastal Region and the Rocky Mountains is an interior plateau drained by the Fraser and Columbia Rivers. There is just enough rain from the cyclones of the westerly winds for grass to grow over most of the region, but there are few trees and cultivation without irrigation is possible only in a restricted area. Wheat can just be grown with the scanty rainfall, mainly in the state of Washington, but other kinds of agriculture (such as fruit farming) must depend on water brought down by the rivers from the surrounding mountains. Water-power is also obtained from these rivers, and at Spokane the falls are used to mill the wheat.

* The chief trans-continental routes should be traced out from the atlas ; it is a very useful exercise to describe the different regions through which these pass, and thus to obtain an idea of the kinds of country that would be traversed in a journey by the various routes.

The Californian Region.—In latitude, position, climate, and the natural and cultivated vegetation, this region may be called "Mediterranean," but the relief and structure of the land cause it to differ in other respects from the European region.

The two great mountain ranges of the North-west Region are continued here as the Coast Range by the Pacific and the Sierra Nevada (the "Snowy Range") on the landward side of the Great Californian Valley. As the Sierra Nevada prevents sea-winds from reaching the interior, the fertile region of California is restricted to a relatively narrow belt running from north to south, instead of a much greater belt running from east to west as in the Mediterranean Region. Two rivers drain the Californian Valley, the Sacramento flowing from the north and the San Joaquin from the south; these unite to reach the sea through a gap in the centre of the Coast Ranges. In this gap is San Francisco Bay, which is almost enclosed but opens to the ocean by a narrow passage called the Golden Gate.

The region has a number of extinct volcanoes and is still subject to earthquakes. In 1906, a large part of San Francisco was destroyed by an earthquake and the fire which resulted from it.

The streams coming down into the "Great Valley" from both sides have covered the bottom with fertile soil; the southernmost part of the valley is a small inland drainage area in which is Lake Tulare. The existence of such a lake is due to the light rainfall of this part of the region; even with the winter rains the lake is not increased so as to drain to the sea. The more northerly parts of the valley have more rain, but the greatest amount falls on the mountain slopes, and irrigation is largely employed for cultivation.

California is so shut off from the east of the United

States that it was first settled by Spaniards who came along the Pacific Coast from the south ; hence many of the names, both of people and places, are Spanish. The first-comers had great estates on which cattle were kept, but this did not give a living to many people. Then came the discovery of gold, and in 1849 * there was a rush of miners who braved the difficulties and dangers of a journey across the continent, exposed to the attacks of Indians on the plains, cold on the mountains, and thirst in the deserts.

When their hopes gave out or the " finds " were exhausted, many of the miners took to farming, and wheat raising became important. Meanwhile, lumbering developed, for the northern part of the Coastal Ranges and the Sierra Nevada have trees like those of the Northwest Coastal Region, the giant sequoias being specially important. Cattle-rearing, mining, wheat-growing, and lumbering still continue, but much more important than these is fruit-growing. This industry developed with the making of railways which take the fruit quickly to the eastern markets, and with the construction of irrigation canals to give water when and where the rainfall is insufficient. The hot dry summers ripen the fruit and give its flesh a firmness which enables it to stand transportation and remain fresh, though most of it is sent away preserved in tins. Practically all fruits of the temperate zone are obtained, including olives, almonds, and figs, and wine is made from the grapes. Even rice is now grown in the lower Sacramento region. San Francisco is the port of this fertile area, and also the terminus of the central group of trans-continental railroads.

* It is clearly to California that the song refers :

In a cañon, in a cavern
Excavated for a mine,
Dwelt a miner, Forty-niner,
And his daughter Clementine.

To the south of the Great Valley is a relatively small plain around Los Angeles, surrounded by mountains on the landward side. It is so far south that the winter rains are short and scanty, there is bright sunshine almost throughout the year, and the winters have the temperature of early summer in England. Therefore many people have gone to live at this place seeking health or pleasure, and its attractiveness is increased by the great orchards of fruit trees grown upon the mountain slopes and dependent upon waters from the streams which descend from the heights. The people, too, depend upon water brought from a distance ; a huge aqueduct brings the supply over 200 miles from the Sierra Nevada. In recent years a large number of people have settled here in connection with the cinema film industry, for this locality has an almost constant, bright light suitable for photography, and a great variety of scenes for the pictures : large towns, the seashore and neighbouring islands, great mountains and sterile deserts.

Still another resource of this district is the petroleum which, together with that obtained from the southern part of the Great Valley, makes California one of the chief oil-producing regions of the world. The oil is largely exported, but in part used for many purposes in the district, and manufactures have sprung up in Los Angeles using oil engines to produce power.

Because of these developments, Los Angeles almost doubled its population in the period from 1910 to 1920 ; it is now even larger than San Francisco, both cities having more than half a million inhabitants. It should be noticed, also, that the southernmost of the great transcontinental routes reaches San Francisco by way of Los Angeles.

The South-west Desert Region.—The enclosed mountain area east of the Sierra Nevada is arid ; the conditions

of temperature and rainfall in the northern part of the region is shown by the graphs in Fig. 9 for a place in Idaho, on a tributary of the Columbia river. Further south the rainfall is still less and the region is one of inland drainage; this part is often called the Great Basin. In it is the Great Salt Lake, by which is the Mormon settlement, Salt Lake City. The population of the state of Utah is chiefly in the neighbourhood of this city, and is dependent on water from the Rocky Mountains which adjoin it on the east.

In the Great Basin is the state of Nevada, which has a dwindling population; its mines of gold, silver, and other minerals are being exhausted, and even though irrigation is being developed, the possibilities of agriculture are very limited.

The region is prolonged southward to include the peninsula of Lower California between the Gulf of California and the Pacific Ocean. This is desert, not because it is enclosed, but because it is in the latitudes of the trade-winds. Into the Gulf of California flows the Colorado River from the High Plateau and the Rocky Mountains, and its water is employed for several irrigation works.

The High Plateau.—The northern part of this region is in the United States, and is drained by the Rio Grande and the River Colorado. The Colorado River is famous for the wonderful cañons which it has cut; they are much greater than those of the Yellowstone River, for they have depths of 6,000 to 8,000 feet, and though narrow at the bottom are miles wide at the top. In this country travelling is very difficult, both because of the almost impassable cañons and gorges and also because of the barrenness of the country, relieved only by such plants as sage-brush, cactus, and spiny yuccas. Because

parts of the region are so inaccessible, some Indian tribes still live here little affected by civilisation, keeping goats and sheep where pasture can be found, growing a little maize where an occasional stream allows, living in tents or in adobe (dried mud) huts, or even in caves in the mountain sides.

The Mexican part of the plateau is enclosed by high ranges known on both sides as the Sierra Madre ; at their meeting-point are the great volcanoes, such as Orizaba and Popocatepetl which reach heights of nearly 20,000 feet, and others which are still active.

Parts of the cool, dry plateau of Mexico are covered with the sage-brush type of vegetation, others have grass and in these parts pasture is the chief occupation ; elsewhere irrigation is used for farming, and here maize and wheat are grown. The mountain slopes are forested with oaks, pines, and firs, but lumbering is not carried on to any large extent. In the north-eastern part of the plateau grows a shrub called guayule, from which in recent years rubber has been obtained. The Spaniards originally went to Mexico for the gold and silver found in the mountains ; these ores are still mined and, in addition, copper, lead, and graphite.

On the plateau is situated the capital, Mexico, with over a million inhabitants. The city has marked contrasts between the modern hotels, great shops, motor cars and electric trams in one quarter, and in a neighbouring one the adobe huts and laden donkeys of the poor Indians.

The Central American Region. — Two types of country make up this region : the cool highlands with wooded slopes, and the hot wet lowlands which are naturally dense jungles. Gold and silver are the chief products of the highlands ; the forests yield mahogany,

rosewood and other cabinet timbers, and dye-woods such as log-wood. The lowlands are partly cleared and have plantations in which cotton, maize, coffee, cacao, sugar, bananas, and tropical fruits are grown.

In the northern, that is the Mexican, part of the lowland area, a great quantity of petroleum is now obtained, particularly in the district near the port Tampico, and near the Isthmus of Tehuantepec.

Yucatan is rather different from the rest of the region ; being low, it has less rain and it is formed of a limestone through which water easily sinks. Consequently it has a poorer vegetation and its chief product is sisal hemp, a fibre used largely for making cords for binding other vegetable products.

The Panama Canal is in this region ; it was made by the United States who obtained from the republic of Panama a zone ten miles wide for this purpose. The greatest difficulty was that of disease, and to get rid of this the United States authorities had to enforce most stringent regulations as to sanitation, and in particular they drained the zone so that the mosquitoes which carried malaria and yellow fever could no longer breed. The canal is fifty miles long, and is particularly useful to the commerce of the United States, for it enables the two sides of North America to communicate by water far more easily than before, and also for the eastern United States to get into closer touch with the western coasts of South America.

The countries of Central America, like Mexico, are inhabited by Spaniards, Indians, and half-breeds, and they have had governments no more stable than that of Mexico. There are now six small independent States, Panama, Costa Rica, Nicaragua, Guatemala, San Salvador, and Honduras ; and in addition there is the still smaller British possession of British Honduras.

The West Indies Region.—Because of their position, surrounded by a warm tropical sea, the islands of the West Indies have a climate which is almost uniform as regards heat, the sea-level temperature ranging between about 75° and 80° F., and although the greater rainfall occurs in the warmer period, there is no part of the year which can be called dry. As Eastern Asia is visited by “typhoons,” so the West Indies experience “hurricanes,” very similar storms which frequently skirt or cross the islands in late summer, and may do great damage to crops and buildings. There are three groups of these islands: (1) the low coral-built Bahamas; (2) the Greater Antilles, viz. Cuba, Haiti, Porto Rico, and Jamaica, with high mountains; (3) the Lesser Antilles, which are arranged in a chain curving to the South American coast.

Sugar and tobacco are the two chief products; fruits (such as bananas, pineapples, oranges, and pomegranates), cocoa, rice, coffee, and coconuts are also grown. The forests yield cabinet- and dye-woods like those of Central America. Of the larger islands, Cuba and Jamaica are by far the most important; Havana cigars from Cuba, and Jamaican sugar are famous.

The people are almost entirely descendants either of Spanish settlers or of negro slaves. In Cuba there is a majority of Spanish descent and the island has an independent government. In Porto Rico there is also a majority of white or partly white people, but the island is governed by the United States. In Jamaica, the negroes form the great bulk of the population and the island is a British possession. Haiti, also almost entirely negro, is divided into two portions: the western one is a republic under the protectorate of the United States, and the eastern one, known as Santo Domingo, is an independent republic. The smaller islands belong to Britain, France, Holland, and the United States. The unhappy history of the

negro republic of Haiti, with its repeated massacres and the ruination of its industries, suggests that in these islands a longer period of political education is necessary before the descendants of the slaves can form a good government and ensure the prosperity of their country.

SOUTH AMERICA

Relief and Structure.—The fold-mountains that encircle the Pacific Ocean form the “backbone” of South America. The Andes therefore show many of the features which are found in the Cordillera of North America, for earthquakes are frequent, extinct and active volcanoes are numerous, and there are valuable deposits of gold, silver, and other metals.

The Andes are narrower and higher than the Cordillera of North America ; they have an unbroken extent from north to south for more than a third of the distance from the north pole to the south pole. This great mountain area may be divided into three portions. (1) The Northern Andes (see Fig. 10) are arranged in more or less parallel chains which in the extreme north diverge from one another ; the easternmost of these chains curves markedly eastward and is continued by the islands of the Lesser Antilles. (2) The Central Andes broaden out, so that bordering ranges include a high plateau ; several peaks have a height of about 20,000 feet. (3) The Southern Andes are narrower and parallel chains are again found ; the western one is partly drowned and forms the archipelago of Southern Chile, the eastern portion becomes gradually lower and turns eastward to form the island of Tierra del Fuego.

There are two highland regions in the east of the continent : those of Guiana and Brazil. Both are of the block-mountain type, portions of a greater mass of ancient and hard rock once worn down to a peneplain, but since broken and dislocated in such a way that large

areas have disappeared while others have been uplifted. These highlands are therefore flat-topped and plateau-like on the whole, though cut into by streams. The Guiana Highlands are tilted so that their higher and steeper edge (at one point nearly 10,000 feet high) is in the west and there is a gentle slope towards the Atlantic. The Brazilian Highlands are tilted in the opposite direction ; a steep escarpment facing the Atlantic rises to over 10,000 feet, and the gentle slope is inland. Like most other block-mountains, these highlands have varied mineral deposits.

Between the three highland areas are three lowlands, each with its river system. In the north, between the Andes and the Guiana Highlands, is the region known as the Llanos drained by the Orinoco River. In the centre is the great plain of the River Amazon. In the south is the region drained by the rivers which enter the estuary known as the Rio de la Plata and by smaller ones which flow eastward from the Southern Andes directly to the Atlantic.

These plains are floored with younger and softer layers than those which form the highlands, and over great areas their sedimentary rocks have been covered with recent alluvium brought down from the uplands. Their resources are therefore in their vegetation and not in mineral wealth, but parts of them are so ill-drained that at present they are of more harm than use to mankind.

The Climate, Vegetation, and Natural Regions.—In these respects South America shows certain similarities with Africa, so far as the two continents are in the same latitudes.

In each continent there is an equatorial region with constant heat and great rainfall, covered with dense forest ;

in South America this is the Amazon lowland. Of much



FIG. 10.—Natural Regions of South America,

the same type are coastal regions just north of the equator: the Guinea Coast lands of Africa and the Guiana Coast

lands of America. With the latter may be included the delta of the Orinoco River.

North of the equatorial forest is the region of great heat but with summer rains only, and consequently grassland of the savanna type. In South America this kind of country is best represented by the Llanos; the adjoining Guiana Highlands have rather more rain and therefore more trees.

South of the equator are similar regions, although their summer rains come in the January instead of the July part of the year. In South America, there are three regions which are broadly of this type: the Brazilian Highlands and the two lower regions to the west of it, one draining to the Amazon and the other to the Rio de la Plata. Between the Brazilian Highlands and the Atlantic is a region to which the trade-winds bring rain because they are forced to rise by the heights behind. This is therefore a hot, well-watered and forested area.

South of the forests and savannas is a region with less heat and rain, and consequently a temperate grassland; in South America this is the Pampas region situated around the La Plata estuary.

The remaining regions of South America differ in their arrangement from those of Africa, because of the existence of the Andean Highlands near the west coast; the western part of South America is more easily comparable with the western part of Central and North America.

The Andean Highlands themselves may be divided into Northern, Central, and Southern Regions as already indicated. The ranges are forested until the tree-line is reached, but the enclosed high plateau of the centre is cold and dry, and therefore almost desert.

The North-western Coastal Region has a climate, vegetation, and productions very similar to those of Central America.

From 5° to 30° south of the equator is a strip of coastal lowland sheltered from the south-east trade-winds by the high wall of the Andes ; consequently it is a region of descending dry air and is desert. It corresponds in part with the dry region of Lower California in North America, but it continues nearer to the equator because of the unbroken line of the high Andean Mountains as compared with the broken elevations of Central America.

The belt of westerly winds swings northward over Central Chile in its winter and so gives it rain during that season, but the south-east trade-winds of summer are dry : hence this region is of the Mediterranean type in climate and products and compares with California in North America.

Southern Chile has westerly winds and rain throughout the year ; it is a forested region and corresponds with the north-west coastal region of North America.

The Southern Andes shut off the south-eastern part of the continent from the westerly winds ; hence this region is relatively dry and is a scrubland, largely in the district known as Patagonia. This region has the ocean on the east of it, and therefore has not such an extreme climate as the High Plains of North America which have a somewhat similar position in the lee of the Rocky Mountains.

The People and States.—Both North America and South America are roughly triangular with the narrow end pointing southwards, and the great difference between the two continents is that whereas in North America this narrow end projects into the tropics, in South America it projects into the temperate zone. Consequently about two-thirds of South America are within the tropics and broadly speaking do not form a “white man’s land.”

Moreover, much of the coastland of this tropical

portion is low-lying and unhealthy, part of it is desert, and behind long stretches of the coasts rise steep highlands. The Orinoco and Amazon rivers seem to offer good waterways into the country, but their lowlands are flooded for months in the year. Consequently access to the greater part of the continent was barred to the Spaniards.

Nevertheless, attracted by tales of the wealth of gold and silver, they penetrated to the interior. In the high valleys and on the plateaus of the Andes from the equator to about latitude 30° S. there was a civilised empire of Indians, ruled by the Incas, who in the cool climate of the mountains had carried on agriculture, made mines and built cities and temples ornamented with gold and silver. The Spaniards destroyed this civilisation, treated the Indians most cruelly, and forced them, as slaves, to get the precious metals.

Other mines were made in the Andes north of the equator, and so Spanish settlements arose at various parts of the highlands, connected by roads with convenient ports.

After the first period of conquest, more Spanish settlers came ; they married Indians, and thus a population of Indians, Spaniards, and ' Mestizos ' occupied the more habitable parts of the highlands, where both mining and agriculture could be carried on, and also the coastal regions near the ports.

South of the tropics there were later Spanish settlements where agriculture and the keeping of animals were the chief occupations ; these settlements were chiefly near the La Plata estuary and in the fertile lands of what is now Central Chile. Here Indians were employed as labourers and there was some inter-marriage, but as these lands can be settled and worked by white people there has since been a considerable immigration from southern

Europe and these regions have now a much larger proportion of white inhabitants than the tropical parts of the continent. In recent years there has been a great immigration of Italians to Argentina ; they are hard-working and form an important element in the population of that country.

These occupied lands, including both the Andean highlands and also the fertile regions beyond the tropics, were originally Spanish possessions, but the settlers were taxed by Spain and in time resented Spanish rule. In the early part of the nineteenth century they rebelled ; the various settlements threw off European domination and established governments of their own, generally modelled on that of the United States. Thus the chief populated areas became the centres of separate independent states, and hence the Spanish-speaking countries of South America may be grouped into two sets.

In the first set are those which have been formed around the mining and agricultural districts in the Andes and their connected seaports : Venezuela which straddles across the north-eastern Andes ; Colombia, Ecuador, and Peru further south ; even Bolivia, which had an outlet to the Pacific until its coastal territory was taken by Chile. In all these lands there is a very large proportion of Indians and Mestizos.

The other group of states is that of the extra-tropical lands : Chile which has the narrow strip of country west of the crest-line of the southern Andes, and the two countries which share the La Plata region, Argentina and Uruguay. In these three states there is a larger proportion of Europeans and a smaller proportion of people of Indian descent.

Brazil and the Guiana lands are not Spanish-speaking countries. Brazil is a Portuguese-speaking state, for it became a possession of Portuguese adventurers. Its

most valuable lands are the coastal margins of the Brazilian Highlands ; here plantations were formed, and to work them the Portuguese imported negro slaves from Africa. Hence in the greater part of Brazil the people are mainly of Portuguese, Negro, or mixed (" Mulatto ") descent. In the Amazon valley there are Indians, though in relatively small numbers ; in the south-east districts of Brazil, near or south of the Tropic, there are settlements of Germans and other Europeans.

The adjoining state of Paraguay, just on the Tropic, has a small but very mixed population of Spanish, Indian, and Negro descent.

The hot, wet lowlands of the Guianas attracted neither the Spanish nor the Portuguese, whose colonies in the other parts of the continent were acquired in the sixteenth century. It was not till a hundred years later that plantations were established here, and worked by Indians and Negroes. They are now owned by Britain, Holland, and France, but there are few European inhabitants, and to British Guiana many " East Indians " have been brought as labourers.

The states of the north-western parts of the continent, with their very mixed and largely uneducated populations, have governments which have been as unstable as those of Mexico and Central America. For example, Venezuela has had fifty revolutions since the middle of the nineteenth century, revolutions accompanied by the killing of people and the destruction of property.

Similarly there have been repeated quarrels between neighbouring states, especially about their frontiers, for quite apart from any desire of a state to possess territory claimed by another there is great uncertainty as to where the boundaries really are. Much of the land is not carefully surveyed, and even the people who make the agreements have not accurate maps, and they may not

know the nature of the country or the ownership of the ground which is in dispute. Even yet the maps published by the different governments do not agree with each other, and so the maps made from them and printed in British atlases may show the boundaries of the states in different positions.

All the South American states have now joined the League of Nations, and so it is to be hoped that the disputes will be settled by the machinery provided by the League and that the period of hostilities is now past.

South America has not shared the fate of Africa and Asia, in being the scene of struggles for power among the great states of Europe. Africa and Asia, as we have seen, were thus "invaded" during the nineteenth century, but early in that century the United States declared that no European power would be allowed to intervene in the politics of South America or to increase its territory in the New World. This policy was laid down by President Monroe, and is therefore known as the "Monroe Doctrine," and no European nation has interfered with the continent in the face of this firmly held, and repeatedly asserted, policy of the United States.

Latin America, as Mexico, Central and South America are often called, is closely associated with the United States in several ways, both political and economic. Much of the capital invested in South America has been supplied by the United States, and the financiers of that country practically control a number of the important industries and businesses of South America. The United States has much commerce with the Latin American states, and its ships are to be seen in all the ports.

In the following sections, each country of South America will be briefly described in connection with the natural regions of which it is composed.

Venezuela.—The greater part of this country falls within four regions: the North-western Coast Region, the Northern Andes, the Llanos, and the Guiana Highlands. The Northern Andes are here relatively low, and their uplands are the healthiest and most populated part of the country. These yield coffee, the chief commercial product of the country, while from lower lands cacao, tobacco, sugar, and cotton are obtained. Gold, oil, and other minerals are among the chief resources of Venezuela.

The capital of the country, Caracas, is situated inland, on a plateau surrounded by beautiful mountains, and stands out markedly from its green environment because of its white-painted walls and red-tiled roofs. The railway that joins it to the port, La Guaira, needs many windings in order to cross a high ridge and deep ravines. Caracas is a town of about 100,000 people; the population of the whole state is $2\frac{1}{2}$ millions.

Between two branches of the Andes is the Gulf or Lagoon of Maracaibo, on the shore of which is Maracaibo, another port. The first Spaniards who came to this lagoon saw Indian houses built on piles which reminded them of Venice; they called the place "Little Venice," Venezuela, and this name was later applied to the whole country.

East of the Andes is the Llanos region ending seawards at the mangrove swamps of the Orinoco delta. During the summer months (*i.e.* the northern summer) these plains are flooded by the heavy rains and the districts near the river are like a vast inland sea. The higher lands are grasslands on which cattle, horses and mules are kept in great ranches, whose occasional communication with the outer world is by steamer on the Orinoco River.

The eastern part of Venezuela is formed by the Guiana

Highland, where trees are more abundant and much of the country is indeed forest ; it is a wild country where the few Indians live a very primitive life partly by agriculture but largely by hunting and fishing.

Colombia.—Colombia has three well-marked divisions. In the west is the coastal lowland region, yielding the same products as the corresponding region in Venezuela. Next is the highland region, on whose slopes coffee is grown and cattle are reared, and in which there are valuable mines of gold, silver, and platinum. The highland region is divided into two parts by the long and deep valley of the Magdalena, which provides a road from the ports, Barranquilla and Cartagena, at its mouth, to the mining centres and the capital, Bogota, situated high up on the mountains. It is a week's journey by river and railroad from the ports to the capital, which is about 9,000 feet above sea-level, and is a well-built city of nearly 200,000 people. The population of Colombia is about 5 millions.

In this part of the Andes, the region is divided according to elevation into zones which have distinctive names. The zone up to 3,000 feet with dense equatorial forest and jungle, or tropical plantations, is the *Tierra Caliente*, or Hot Land. From 3,000 to about 6,500 feet is the *Tierra Templada*, the temperate zone, with evergreen and deciduous trees and such products as coffee and maize. From 6,500 feet to 10,000 feet is the *Tierra Fria*, the cold zone, where there are coniferous trees and grass, and the agricultural products of central and northern Europe may be grown. Above 10,000 feet are the *Paramos*, the bare, cold and partly snow-clad areas above the tree-line.

East of the Andes, Venezuela extends over the flat plains drained by the headstreams of the Orinoco and the

Amazon. The region is so flat that one river, the Cassiquiare, unites these two river systems. It is very little developed, for access to it is gained only after traversing either the Andes or Guiana Highlands or the whole of the length of the Orinoco or Amazon Rivers.

Ecuador. —“ Equator-land ” has the same three divisions, and almost the same characteristics as Colombia. Its coastal plain has the same products, the Andean region is similar though narrower, and the eastern lowlands form part of the Amazon Basin.

The coastal plain, however, is less well watered than that of the more northerly states ; the southern part is almost a savanna land and cattle are raised upon it. From Guayaquil a large proportion of the world's cocoa supply is exported, together with much coffee and many hides. In addition, from this part are obtained “ vegetable ivory,” a very hard substance found in a nut and used for making buttons and other objects, and also the “ Panama ” hats woven with great care from fibre obtained from the leaves of a forest plant.

It was at Guayaquil that a Japanese medical man, working in connection with a United States research organisation, found that yellow fever was carried by a particular species of mosquito, whose larvæ lived in water. The larvæ were destroyed by pouring a film of oil on ponds, etc., or by introducing minnows which eat them, while water-tanks were carefully protected by screens. By such means Guayaquil, Rio de Janeiro, and other ports of South and Central America were relieved of this pest, and made much more healthy.

In Ecuador the Andes are surmounted by a large number of volcanoes of which several reach an elevation of nearly 20,000 feet and are still active, though the greatest of all, Chimborazo and Cotopaxi, are now extinct.

Quito, the capital, is situated on the equator at an elevation of over 9,000 feet. The mean temperature is $54\frac{1}{2}^{\circ}$ F. in the "coolest" month and 55° F. in the "warmest" month, and the city is therefore sometimes said to have an eternal spring. But the climate is not as pleasant as the phrase suggests, for the nights and early mornings are cold and raw, while at mid-day there is often considerable heat and a thunderstorm, with rain or sometimes snow. The surrounding district is almost treeless, and the chief crops that can be grown are barley and potatoes.

Quito is connected with Guayaquil by a narrow-gauge railway ; it has less than 100,000 inhabitants out of a total of about 2 million in the Republic.

Peru. — Like the preceding states, Peru straddles across the Andes, but it differs from them in having a coastal region which is almost rainless and almost unproductive. There are two kinds of inhabited land in this desert strip. One is the irrigated land along the lower courses of the rivers which cross the narrow plain from the highlands ; on this land cotton, sugar-cane, and rice are grown. The other is that occupied by the ports and by Lima, the capital ; these towns are, of course, supplied with water in a similar manner. The chief port is Callao, which serves as an out-port to Lima, seven miles inland. Lima has a population of less than 200,000 ; the total population of Peru is about 5 millions.

From Lima and Callao a railway ascends to the plateau region, on which live the great majority of the population ; it reaches a district which is one of the most productive in silver and copper. Near the southern border of Peru there is another railway ; this ascends from the port of Mollendo to the plateau, where one branch goes northward to Cuzco and another branch goes

southward to Lake Titicaca. Cuzco was the capital of the old empire of the Incas where remains of the Indian palaces, temples, and forts may still be seen ; the enormous size of some of the stones of which these buildings are made is remarkable, for they may weigh nearly 100 tons, and clever engineering methods must have been used to put them, carefully chiselled and fashioned, into position.

Lake Titicaca is more than 12,000 feet above the sea ; it is over 100 miles long, and lake steamers form part of the system of communications upon the plateau. In its waters are fish which are the food of the Indians who live by its shores.

Much of the plateau land is too cold and dry for cultivation ; the country is treeless, and most of the people get their living by keeping animals on the scanty pastures or by irrigating terraces on the mountain slopes. The animals of the plateau are sheep, alpacas, llamas, and vicuñas ; these all yield wool and that of the alpaca is exceptionally strong and elastic, and consequently valuable. The llama has longer legs and neck than a sheep and somewhat resembles a camel ; it is like a camel, too, in being a beast of burden in a desert or semi-desert region. The vicuña has wool even more valuable than that of the alpaca, but it lives in higher parts and is not domesticated ; consequently it has to be hunted and its wool is difficult to obtain.

To the east of the plateau are the mountain slopes and the lowland forests of the Amazon Basin. From the former came " Peruvian bark," the bark of the cinchona tree from which quinine is extracted. Because of the great medicinal value of quinine, cinchona trees were transplanted to Ceylon and the East Indies, whence the greatest supplies of the drug are now obtained. From the Peruvian part of the forests of the Amazon the chief product is rubber. Some years ago, the Indians who

collected this were so ill treated by their masters that the cruelties roused the indignation of the more civilised countries, and the United States and Britain together protested to the Peruvian government and the conditions were improved.

Bolivia.—The state of Bolivia has a population of nearly 3 million people, and a considerable proportion of its wealth is from the mines, especially of tin, silver, and copper. The silver-mines of Potosi have been famous since the Spaniards reached the country. Western Bolivia shares the Andean plateau with Peru, and its characteristics are therefore like those described above. The chief town, La Paz, is built in a vast hollow among the mountains ; it has a population of over 100,000 people and is a well-built city with a great cathedral. Steep cliffs 1000 feet high enclose it, and above them rise the snow-clad peaks of the highest range of all the Andes.

Eastern Bolivia is partly in the densely forested Amazon valley, partly in the higher savanna country drained by the upper tributaries of the Amazon and La Plata river systems. There is considerable tree growth on the savannas, and it is impossible to draw a line which definitely separates forest from grassland. The region marked as savanna land on the map of natural regions of South America differs, as a whole, from the Amazon lowland because in it the forest growth is not of the dense equatorial type, it is not commonly flooded in the wet season, and its people get a living not by collecting rubber and timber, but by keeping cattle and hunting.

Chile.—The products of the Bolivian plateau reach the Pacific by railways leading down through northern Chile. This part of Chile is the Atacama Desert region ;

it differs from the corresponding Peruvian desert strip in having great deposits of salt and nitrate of soda which form the topmost layer of the ground on a plateau behind the coast ; the salts are used in Europe and North America for making chemicals, explosives, and manures. Behind the nitrate and salt deposits the mountains yield copper and iron, and all these products are sent out from the ports of northern Chile, of which Iquique and Antofagasta are the chief.

Central Chile supports the bulk of the population of the country, which amounts to about 4 millions, and in it are the largest towns, Santiago the capital, with half a million people, and its port, Valparaiso. Central Chile resembles California not only in its climate and productions, but also in its relief, for its most fertile portion is a long valley that extends between the coast range and the higher mountains behind. Moreover, forests and water-power are utilised, and in their enterprise the Chileans are like the Californians rather than the more northern peoples of South America.

Southern Chile, always in the westerly wind belt, has a very wet climate, and is cooler than most countries in similar latitudes because of a cold current which drifts northward along its shores. It is heavily forested on the mountain slopes, there is a little mining, and some sheep-rearing is carried on in the valleys ; these resources support only a scanty population.

Tierra del Fuego is separated from the mainland by the Straits of Magellan, through which much traffic goes when passing between the Pacific and Atlantic Oceans.

The Argentine Republic.—Among the states of South America Argentina comes second to Brazil in area and the number of inhabitants ; its population is about

9 millions, and its capital, Buenos Ayres, is one of the great cities in the world, with nearly 2 million people.

Few people live in Patagonia, the southern part of Argentina, because of the dryness of the country. Pasture exists near the coast, but behind that is a barren volcanic plateau and a district where sand and shingle was deposited by an ice-sheet which once covered the Southern Andes. There are better conditions close to Andean highlands, where again pastures are found and a little irrigation is practised.

The great majority of the people of Argentina live in the Pampas region, once a "sea of grass"; pampas-grass grew in the wetter parts of this region, while apparently illimitable expanses of flat country were covered with coarse pastures, on which cattle were allowed to roam, or with finer pastures on which fed the sheep. Now enormous amounts of wheat are obtained in the southern portion and maize in the warmer and better-watered northern portion; flax is also grown, largely for linseed, and alfalfa, used as a food for the animals.

In the early days of settlement the cattle were kept mainly for their hides and tallow, for before the invention of refrigerating apparatus meat could not be sent across the equator to Europe, and the loss in sending live animals such a voyage was too great. Hence only hides and tallow were at first exported; later, beef-extract was made and sent away in bottles, and meat was preserved by cooking and packed in tins. Now, all these products are still exported and also frozen carcasses. In this way a great packing industry has grown up in Buenos Ayres on the La Plata estuary, and in Rosario and Santa Fé on the Parana River, but because of the lack of coal in this part of the world, the industry has not become associated with manufactures as it has in the United States.

Westward from the Atlantic the country gradually

becomes drier, less productive, and less densely populated, but near the Andes there is another important region where irrigation from the mountains is the basis of agriculture. Almost due west from Buenos Ayres, in the northward extension of the Patagonian scrubland, Mendoza is the centre of an oasis-like district where fruits such as pears, plums, peaches, and grapes are obtained. Further north, near Tucuman, even the sugar-cane is grown by irrigation.

The commerce of Argentina is carried on from the various ports of the Parana and La Plata, especially from Rosario, which is a collecting centre for the northern part of the region, and from Buenos Ayres, to which the great ocean steamers come. A network of railways centres on Buenos Ayres, and one line unites Argentina with Chile. It goes through Mendoza and tunnels under the crest of the Andes at an elevation of over 10,000 feet. Near this point is Aconcagua, the highest peak in South America, over 23,000 feet in height. The mountain region of Argentina yields much gold, silver, and copper.

Uruguay.—This state is situated entirely in the Pampas Region, east of the Uruguay River, and its characteristics are those of the adjoining part of Argentina. Its chief industries are the growing of grain and fodder, the rearing of cattle and sheep, the packing and exporting of meat and meat-products.

By far its most important town is Montevideo, capital and port, which has 400,000 inhabitants out of a population of about $1\frac{1}{2}$ million in the whole state. Two other towns, well known in Europe because of the tinned meats sent from them, are Paysandu and Fray Bentos.

Paraguay.—This is the smallest and least populated of the South American republics, having less than 1 million

inhabitants. It is situated on either side of the lower Paraguay, the great tributary of the Parana River, and occupies the central part of the Paraguay-Parana Savanna Region.

The low flat plains by the Paraguay River are flooded during the rainy summer, the heat is considerable and this part of the country is unhealthy. Away from the rivers the land is higher, better drained and healthier. The western angle of Paraguay extends into the Gran Chaco (which means the Great Hunting-Ground), an almost unknown area where there are now a few Indians, but in the future there may be great herds of cattle.

Two of the chief products of Paraguay are oranges, which grow wild in such great profusion that they are even fed to the pigs, and maté, or "Paraguay tea," which is similar in the abundance of its growth, but not esteemed so highly in other countries as in Paraguay. These products are sent out through the capital, Asuncion, which is a river port on the Paraguay river and is connected by railway with Montevideo.

Brazil.—The United States of Brazil, to give the state its full name, is larger than the United States of America (without Alaska) and has a population of about 25 millions. The greater part of the people live in the Brazilian Coastlands Region and the adjoining margin of the Highlands. The extreme south of this region, beyond the tropic, has a larger proportion of Europeans than the rest of the country, and includes a German colony.

The most densely populated part of Brazil is that which lies on the tropic of Capricorn, behind the ports Rio de Janeiro and Santos. The coastal lowland is here very narrow and the chief production is coffee, obtained from the plateau, of which this district furnishes two-thirds of the world's supply. On the plateau behind

Santos is São Paulo, the business centre of this trade. São Paulo is a fine city of half a million inhabitants, and has factories for making cotton and other goods used by the Brazilian people ; the machines are run partly by imported coal, partly by water-power. Recently packing-works have been established to deal with the cattle kept on the plateau. Santos is the chief coffee-exporting port.

Rio de Janeiro, the capital of Brazil, is also connected with the plateau by railway ; it carries on business and manufactures like those of Santos and São Paulo combined. The harbour of " Rio," as it is often called, is an excellent one for ships and of surpassing beauty ; it is a great bay ten miles wide, studded with cliff-edged islands, and almost enclosed by verdure-clad hills, on spurs of which the city of over a million people has been built.

North-west of Rio de Janeiro the plateau is rich in minerals ; the gold-mines and diamond-mines have now little value, but manganese is exported and very large deposits of unusually pure iron ore are worked ; a railway has been built 400 miles into the interior to get this ore, now partly used in Brazil and partly exported to Europe and North America. North-east of Rio de Janeiro as far as Cape San Roque there are plantations yielding sugar, cotton, and tobacco ; the chief ports are Bahia and Pernambuco.

The coast from Cape San Roque north-west for about 300 miles (the region is marked off on the map of natural regions) runs parallel with the direction of the prevailing south-east trade-winds. These winds are therefore not forced up and they shed relatively little rain ; consequently this coastal region is subject to droughts and is naturally covered with a thorn-thicket kind of vegetation.

Behind their eastern edge, the Brazilian Highlands get less rain than the seaward slopes, and the almost

enclosed valley of the São Francisco River is semi-arid. Hence much of the plateau is either grass-covered or has thorn forest ; it is a cattle-rearing region. Very similar is the lower region marked as the Amazon Savannas. A large area with relatively many trees is called the Matto Grosso, the Great Woods ; Campos is the name given in this region to extensive stretches of grass-land.

The Amazon Valley is the greatest region of continuous dense equatorial forest in the world. It is practically impassable because of the growth of vegetation in the dry season, while parts of it become great inland seas when the tributaries bring floods to the lowlands. The rivers are almost the sole means of transport ; the main stream is navigable for 2,000 miles, to the foot of the Andes, and its great tributaries, such as the Rio Negro and Madeira, allow traffic to go north and south for hundreds of miles before they are interrupted by falls. The great difficulties in the utilisation of the region are the climate and the diseases. Even native inhabitants are few in number and live mainly near or on the rivers. The chief resource at present is the collection of rubber, and for this purpose labour has now to be brought from distant districts. Dye-woods and cabinet-woods are also collected, and there are small plantations in clearings. Manaos, where the Rio Negro enters the Amazon, is the chief inland trading centre, and Para is the chief port at the mouth of the river. Life is difficult and unpleasant for the traders in the Amazon valley ; it is worse for the Indians, for many of them are "peons," or forced labourers, whose condition is little better than slavery.

The Guianas.—The highlands of the interior of the Guianas are little known and almost uninhabited ; the lowlands are hot, steaming jungles and swamps ; the settled portion is a narrow strip immediately behind

the coast. In this belt are the plantations where sugar is the chief product, and some cacao, rice, and cotton are also grown ; from the interior timber and gold are obtained. The region is unsuited to Europeans, and the European masters have not as yet succeeded in developing the resources of the Guianas.

PART II

THE WORLD AND ITS PROBLEMS

CLIMATES AND THEIR CAUSES *

IN the first part of this book each continent has been dealt with in turn and its natural regions described. It was then seen that climate was an important factor in determining the nature of the regions and the work and characteristics of the peoples. It was also seen that there were broad similarities between regions in similar positions in the respective continents, and that these similarities were in part the effects of certain climatic systems, described either as belts or monsoon systems.

On the western sides of the continents belts were observed, while on the eastern sides in some cases belts, in other cases monsoon systems, were important. These climatic phenomena may now be shown to be parts of one great arrangement extending over the whole world and depending upon the way in which the Earth obtains light and heat from the Sun. This again depends upon the movements of the Earth in relation to the Sun.

The Shape and Size of the Earth.—It is known that

* The subject-matter of this section is more fully explained in "Essentials of World Geography," by J. F. Unstead and E. G. R. Taylor (Philip & Son).

the Earth is in shape a ball, almost exactly a sphere but very slightly flattened in parts, as for example at the north and south poles. Its size is great as compared with human beings, for its diameter is nearly 8,000 miles, but small as compared with the Sun, whose diameter is more than 100 times as great, while the distance of the Sun from the Earth is over 90,000,000 miles.

There are a number of reasons for believing that the Earth is a ball; *e.g.* the shape of the shadow of the Earth on the Moon during an eclipse, and the fact that at sea the "bulge" in the surface hides the hull of a distant ship while the masts are clearly visible.

Another of these reasons is the way in which the Sun appears to people observing it at the same time but from different parts of the Earth. On the left-hand diagram in Fig. 11, the Sun's rays are shown as coming to four observers, A at the equator, B at Lat. 30° N., C at Lat. 60° N., and D at the north pole. The upright position of each observer is shown in each case by the short thick line drawn at right angles to the ground line which is a tangent to the circle of the Earth's circumference. It is clear that at the equator the Sun's rays appear to be coming from the zenith, *i.e.* from overhead; at Lat. 30° N., they come at an angle of 30° from overhead; at 60° N., they come at an angle of 60° from the zenith; at the north pole they come at 90° from overhead, that is, along the ground or from the horizon. Hence to the four observers the Sun appears to be in the zenith for A, at a height of 60° above the horizon for B, at a height of 30° above the horizon for C, and on the horizon for D. These are the observations which would be actually made by people at those places at mid-day on March 21 and September 23, and the observed facts confirm the theory that the Earth is curved in a north-south direction.

The right-hand diagram of the same figure shows how the Sun would appear to four observers at similar distances north and south of one another, on a flat earth. If the Sun were in the zenith for one, it would be in the zenith for all, or if it were at any particular angle for one, it would be at the same angle for all ; * as observations never give this result we conclude that the Earth is not flat, but curved, in a north-south direction.

If the Earth is a ball, however, it must be curved also in an east-west direction, and this may be shown by considering how the Sun appears to different people all of them on the equator, but at different longitudes.

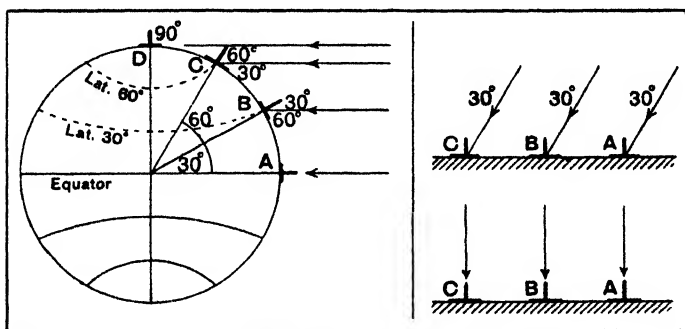


FIG. 11.—The Height of the Sun at Different Latitudes.

Fig. 12 shows a diagram of the Earth as though one is looking down upon it from above the north pole, with the Sun's rays lighting up the right-hand part. A, B, and C are on the equator ; B is a quarter of the earth's circumference from A, and C the same distance from B. A sees the Sun on the horizon, B sees it overhead, and C sees it on the horizon. This condition actually occurs when it is

* Remember that the Sun is enormously greater than the Earth, and also at such a great distance that it cannot be shown on the same page. Its size and distance are so great that all its rays appear parallel to one another.

sunset for A, mid-day for B, and dawn for C ; were the Earth flat in an east-west direction, the Sun would appear either overhead to all or on the horizon to all, as the right-hand diagrams show. These facts therefore lead to the conclusion that the Earth is curved in both directions, *i.e.* that it is a sphere.

Latitude and Longitude.—Circles may be imagined to be drawn round the Earth, parallel with the equator, and marked according to their position. The circle north of the equator at which the Sun is seen to be 1° from the zenith when it is overhead at the equator is said to be the parallel of 1° N., and there are 89 similar parallels on each side of the equator, each smaller than the preceding one until at the north and south poles there is no circle but only a point ; the north and south poles are 90° from the equator. These circles are called parallels of latitude.

Circles may be imagined also to be drawn around the world so as to cut the parallels of latitude at right angles, and to cross each other at the poles ; the halves of these circles which extend from the north pole to the south pole are called meridians of longitude. Fig. 13, in which the Earth is seen from above the north pole, shows the northern halves of twelve such meridians ; they appear on this diagram as straight lines radiating from the north pole (P) to the equator with angles of 30° between them, and if 360 meridians were drawn, each would be at an angle of 1° from its neighbour. One such meridian, that which passes through Greenwich (marked G), is taken as a starting-point, and the others are named according to the number of degrees west or east of the Greenwich meridian.

The position of any point on the Earth's surface can be determined by stating its latitude and longitude ;

e.g. Petrograd is almost exactly 60° N. Lat. and 30° E. Long.

A degree of longitude is always $\frac{1}{360}$ of the distance round the Earth; therefore at the equator a degree of longitude is $\frac{1}{360}$ of nearly 25,000 miles, *i.e.* about $69\frac{1}{2}$ miles, but at other latitudes its length is less. At Lat. 60° the distance round the Earth is half what it is at the equator, and therefore the length of a degree of longitude in Lat. 60° is about 35 miles. On the other hand, a degree of latitude is always nearly the same length, $69\frac{1}{2}$ miles, for it is $\frac{1}{360}$ of a circle going round the Earth and passing through the two poles.

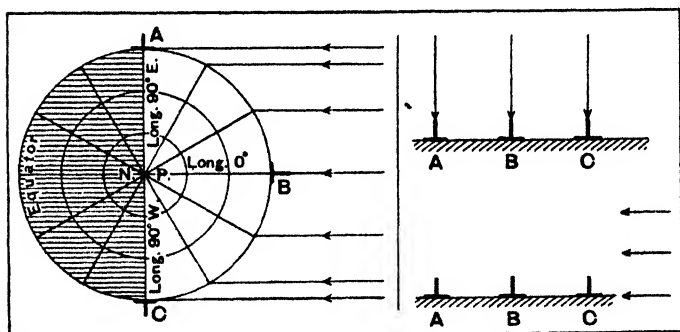


FIG. 12.—The Height of the Sun at Different Longitudes.

The Rotation of the Earth.—Observations of the Sun and the other heavenly bodies show that the Earth moves; it rotates, *i.e.* twists on its axis every 24 hours, and also it revolves or moves as a whole round the Sun every year.

The rotation of the Earth is illustrated in Fig. 13. A place marked A is exactly opposite the Sun and therefore has mid-day. As the Earth rotates in the direction of the arrow (west to east) in 24 hours, a place B, on Long. 30° E., has already passed the mid-day position.

Since B had mid-day it has rotated $\frac{1}{12}$ of the whole distance round (for 30° is $\frac{1}{12}$ of the whole 360°), and this rotation has therefore occupied 2 hours (for 2 hours is $\frac{1}{12}$ of the 24 hours). Hence B now has the time of 2 p.m. when A has mid-day. Similarly C has yet to rotate $\frac{1}{12}$ of the distance before it has mid-day, and therefore the time at C is 10 a. m. when A has mid-day.

It appears, therefore, that for every 15° E. Long., a place has a local time, that is, as judged by the Sun, which is 1 hour after Greenwich time; for every 15° W. Long., the local time is 1 hour before Greenwich time.

A smaller difference of time, of course, exists for smaller differences of longitude; in England, for example, Cornwall is in Long. 5° W., and its local time is 20 minutes earlier than that at Greenwich. If every place in the country used a different local time, there would be great confusion; therefore in England all places use Greenwich time, which is called the standard time for England.

In all the more civilised parts of the world the device of a standard time has been employed, and in Western Europe Greenwich time is used. In Central Europe the time of a place 15° E. has been adopted, because Central European time is then exactly 1 hour later than Western European time; similarly Eastern European time is 2 hours later than Western European time. Thus a traveller to Russia would only have to alter his watch twice in a journey across Europe, putting it forward 1 hour each time he passed from one standard time belt to the next. North America has five standard time belts: Atlantic, Eastern, Central, Mountain, and Pacific; each differs by 1 hour from the next.

The Revolution of the Earth.—While the Earth is

rotating on its axis, it is also moving around the Sun. This revolution takes a year, and the differences between one season of the year and another are due to the fact that the axis of the Earth is slanting as compared with an imaginary line joining the Earth and Sun. This is shown in Fig. 14, but the Sun cannot be put into the diagram because it is so much larger than the Earth and

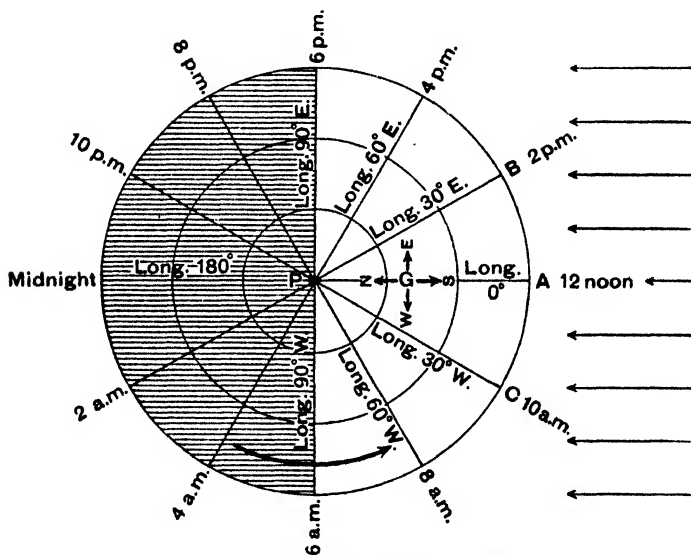


FIG. 13.—Longitude and Time.

so far away. On June 22 the north pole is tilted towards the Sun, and on December 22 it is tilted away from the Sun. The former position gives summer to the northern hemisphere ; the latter position gives winter to the northern hemisphere.

The differences between summer and winter are due to two factors : first, the length of time during which the Sun is shining and giving light and heat ; second,

the height of the Sun in the sky during the middle part of the day.

The Lengths of Day and Night.—In the northern summer, on June 22, the north pole is tilted towards the Sun, and is in the light the whole of the 24 hours ; so is all the region within the Arctic Circle (Lat. $66\frac{1}{2}^{\circ}$ N.). London, in Lat. $51\frac{1}{2}^{\circ}$ N., moves round as shown by the arrow in the diagram, and is in the light longer than in the dark ; the day is more than 16 hours long, the Sun rising before 4 a.m., and setting after 8 p.m. All places in the northern hemisphere have longer light than darkness, and therefore a longer period in which they gain heat from the Sun as compared with the dark period during which only loss of heat by radiation goes on. Hence one cause of the greater heat of summer.

At the equator, day and night are equal, while in the southern hemisphere the period of dark is longer than the period of light and it is winter time. Within the Antarctic Circle, the Sun is invisible ; the south polar regions receive no heat, but only lose it.

Six months later, on December 22, the north end of the axis is tilted away from the Sun, and the conditions are just the reverse of those in June, the northern hemisphere having winter while the southern hemisphere has summer.

On March 21 and September 23, the north pole is tilted neither towards nor away from the Sun. It is on the edge of light and dark, as is shown by the March diagram in which the light half of the Earth is seen and the September diagram which shows only the dark half. The south pole is similarly on the edge of light and dark, but all other places are half the time in the light and half the time in the dark. The Sun everywhere rises at 6 a.m., and sets at 6 p.m. These times of the year are called Equinoxes, *i.e.* the equal night times.

It should be noticed that at the equator the days are always 12 hours in length, while at London there is a gradual increase in their length from December to June, and a gradual decrease from June to December.

Between March and September the north pole is in

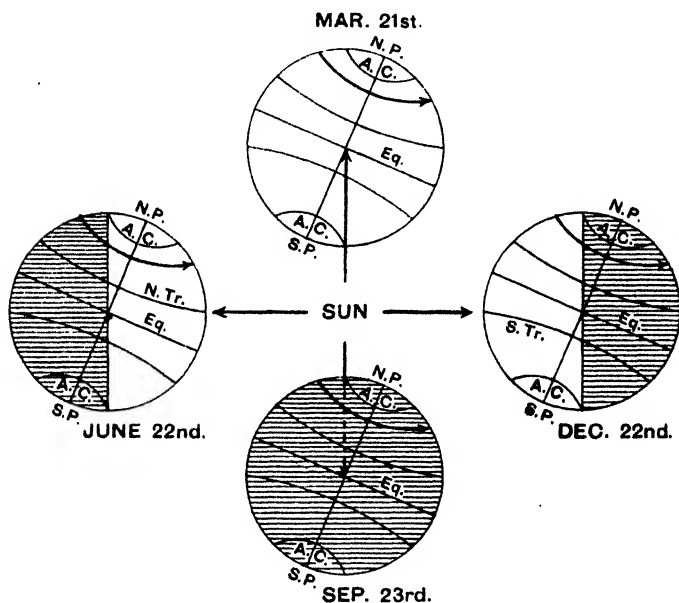


FIG. 14.—The Revolution of the Earth around the Sun.

the light the whole time ; it has a six months' " day." Between September and March it is in the dark the whole time ; it has a six months' " night."

A place exactly on the Arctic Circle would have 24 hours' light on June 22, but each day after this the Sun would be visible for a little shorter period until on September 23 it would appear for 12 hours. Onward from September there would still be a shortening of the

days until on December 22 the Sun would not rise at all above the horizon. After that day it would shine for a very little while, the period of light gradually increasing until it again extended over the whole 24 hours at midsummer.

Between the Arctic Circle where the "day" lasts 24 hours and the north pole where it lasts six months, the "day" gradually lengthens as the pole is approached; for example, in Lat. 70° the "day" is 2 months in duration. Similar phenomena are of course observed in the southern hemisphere.

The Overhead Sun.—The amount of heat received from the Sun at any moment depends upon the height of the Sun in the sky, as we can realise by comparing the heat felt by us when it is high in the sky with that at dawn or sunset when it is just on the horizon. The greatest heat is therefore received at parts of the world where the Sun is overhead, *i.e.* where its rays fall vertically upon the Earth. This only occurs at one part of the world at a given time, and in Fig. 14 (p. 201) the places where the rays fall vertically upon the earth at the four seasons are shown by the arrows going out from the centre of the diagram and striking the Earth. On December 22, the place with vertical rays is the southern tropic (Capricorn); on March 21 it is the equator; on June 22 it is the northern tropic (Cancer); on September 23 it is again the equator, and on December 22 it is once more the southern tropic. Between these dates the position of the overhead Sun changes gradually, day by day, going northward from December till June and southward from June till December.

The belt of greatest heat similarly swings northward and southward; the two tropics (*i.e.* turning-places) are so-called because they are the turning-places of this

swing of the Sun, and it should be observed that they are the limits of the "torrid zone" of the Earth. June 22, when the Sun seems to stop on the northward journey and turn southward, is the summer solstice (*i.e.* the Sun's stopping-time); December 22 is similarly the winter solstice.

The Causes of Summer and Winter.—Fig. 15 shows more clearly the conditions in June and December. In June each place on the Tropic of Cancer, as it is brought opposite to the Sun in the daily rotation of the Earth,

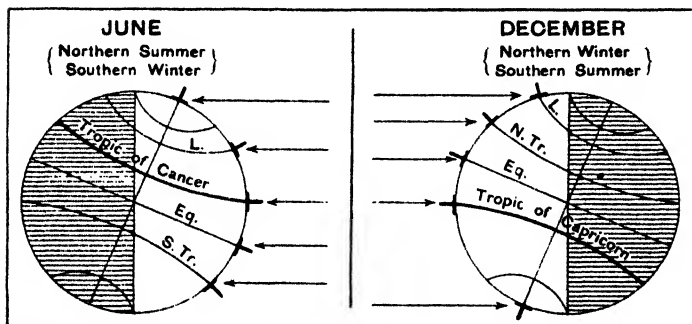


FIG. 15.—The Height of the Sun in June and December.

receives the vertical rays of the Sun; therefore this belt of the Earth has the Sun exactly overhead and receives the greatest possible amount of heat. Also in this latitude the day lasts for nearly 14 hours.

Further north, in the same month, London (shown by L in the diagram) receives heat for a still longer period, but the Sun is not overhead; consequently the total amount of heat received is less.

The north polar regions receive some heat for the whole of the 24 hours; but the Sun is low in the sky and it gives little heat.

At the Equator, the Sun is not overhead and it is visible for 12 hours only ; therefore there is less heat received here than at the Tropic of Cancer. In the southern hemisphere, the day is short and the Sun is still lower in the sky, while no heat at all is received within the Antarctic Circle.

Consequently, of all parts of the world, the belt near the Tropic of Cancer receives the greatest amount of heat in this season, while the southern hemisphere, with a shorter duration and a less intensity of the Sun's rays, has its winter in June.

Similarly, the diagram for December shows the conditions during the northern winter and the southern summer, when the belt near the Tropic of Capricorn receives more heat than any other region of the world.

At the equinoxes, March and September, since all parts of the world have equal lengths of day and night, the only difference is in the height of the Sun. Since this is vertical over the Equator (see Fig. 14 on p. 201) the equator receives the greatest amount of heat. Less heat is received as the latitude increases in either hemisphere till at the poles the sun is just visible on the horizon (see Fig. 11 on p. 195), and therefore gives very little heat.

The Temperature of the Air.—In the preceding paragraphs, heat but not temperature has been considered. The Sun may give the same amount of heat to land and water if they are in the same latitude, but they will not have the same temperature, for a given amount of heat will raise land to a higher temperature than it will raise water. Consequently the lands have a higher temperature in summer than the seas in the same latitude.

Conversely, as winter is a time when there is more heat radiated out than is received from the Sun, winter

is a time of loss for both land and water, but the loss of heat lowers the temperature of the land more than it does the temperature of the water. Hence in winter the lands have a lower temperature than the seas in the same latitudes.

For most geographical purposes, however, we are concerned not so much with the temperature of the land and the water as with the temperature of the air above the land and the water. The rays of the Sun pass through the air without increasing its temperature appreciably, and its temperature is mainly affected by the land or water beneath it.

Thus the air immediately over heated land is itself heated by the earth and its temperature is raised ; some of the heat is passed on to the next layer above and the temperature of this second layer is also raised but to a less degree than that of the first layer. In this way the air temperatures become less with greater height, and this explains why equatorial mountains are capped with snow. Over the sea the air is similarly heated by the water ; but as in summer the sea is at a lower temperature than the land the temperature of the air above the sea will then be lower than that above the land. On the other hand, in winter air over the oceans is usually warmer than that over the land in the same latitude.

Putting together the results of the last few paragraphs, we may understand the reasons for the sea-level temperature maps of the world in January and in July.

The map in the atlas shows that in January the hot part of the world is a belt which on the whole is situated between the tropics, but extends further to the south of the equator than it does to the north of it, the hottest parts of all being in Africa and Australia near the southern tropic.

There are two distinctly cold parts of the world,

i.e. those with a mean temperature below freezing-point, in January. One of them is in the southern hemisphere within the Antarctic Circle. The other is in the northern hemisphere and it extends far to the south of the Arctic Circle, for over the land-mass of America it reaches Lat. 40° , and over the greater land-mass of Eurasia it reaches below that latitude. The effect of the westerly winds is clearly shown on the north-west coasts of North America and Europe, for they bring ocean warmth to these regions, and the isotherm of 32° F. is found much further to the north on the west than on the east coasts of the continental areas. The coldest region of the world is in north-eastern Asia, as was stated in the first part of this book.

In July, the hot part of the world is again a belt which lies partly between the tropics, but is now swung northward so that it extends over the central parts of North America and Eurasia, while the hottest parts of all are in the south of North America, in the Sahara and in south-western Asia, on either side of the northern tropic. (Remember that sea-level, not actual, temperatures are here considered.)

There is no sea-level temperature below freezing-point to be seen on the map in the northern hemisphere, but in the southern hemisphere the cold cap around the south pole has extended to include all the area south of Lat. 60° S.

The colder climates of mountain regions have been referred to in the first part of the book, and also the plateau conditions of extreme temperatures, relatively hot in summer and in the daytime but relatively cold in winter and in the night-time.

It should be noted that the period of greatest heat comes *after* a region has the Sun at its greatest height. Thus in England the hottest time of the day is an hour

or two after the Sun is highest at noon, and similarly the hottest time of the year is July, the month after the summer solstice. This is because in the period just after the Sun reaches its highest point it still has enough power to add more heat to that already possessed by the Earth, and so to raise the temperature a little higher.

Conversely, the coldest part of the year is after the winter solstice, for during the first part of January the sun is still low in the sky and therefore gives less heat than is radiated outward by the Earth; consequently the temperature continues to fall a little. For these reasons, the months of highest and lowest temperatures are usually July and January, and those months are taken as most typical of the summer and winter seasons.

Similarly, not March nor September, but April and October best show the conditions between July and January when the hottest part of the world is neither in the northern nor in the southern hemisphere, but around the equator.

High and Low Pressure Systems.—Where the air is heated it expands, and this expansion takes place most markedly in an upward direction. Therefore, by the upward expansion of the surface air, the upper air is raised to a higher level above the hot area than above cooler regions on either side, and the air in these higher levels flows outward over the cooler areas (see Fig. 16). This removes some of the air from over the heated area, and adds to that over the cooler area.

Now the pressure of the surface air varies according to the amount of air weighing down upon it. If there is much air weighing down upon the surface air, the latter has a greater pressure upon it and consequently itself presses outward with more force; with less air

above it, the surface air has less pressure upon it and exerts less pressure upon the surrounding air.

Therefore, as some of the upper air over a heated area is removed, the pressure of the surface air in the heated area is reduced. Similarly, as the upper air flows over the cooler area, the pressure of the surface air in the cooler area is increased. Hence a heated area has low pressure, and a cooler area has high pressure, at the surface (again see Fig. 16).

It has next to be realised that where on the same level there are different pressures, the air at high pressure pushes away the air at low pressure. If, therefore, there is an area of low pressure with areas of high pressure on either side, the air will be pushed along the surface into the low-pressure area and there, because of the continued pressure upon it, it will be forced up. Hence an area of low pressure has rising air.

Meanwhile over the areas of high pressure, air is coming in at high levels and going out along the surface, and to balance these changes the air sinks down from the upper levels to the surface. Hence an area of high pressure has sinking air.

In the centre of the high and low pressures, the air sinks or rises but does not blow horizontally ; the centres of the areas therefore have relative calms although there are winds blowing between the high- and low-pressure areas.

As air rises it is cooled, and therefore cannot hold as much water vapour ; if the air has much water vapour in it, this must be condensed, clouds form and at last rain falls. Conversely, as air sinks it is warmed and can hold more water vapour ; evaporation takes place rather than condensation, the sky is clear and the weather is dry.

These conditions are all shown in Fig. 16, and the

facts shown in this diagram may now be applied to great regions of the world.

The Belts of Winds and Calms.— In the April and October periods, the equatorial region is a belt of high temperature and low pressure, with belts on either side of it which have lower temperatures and higher pressures. Therefore near the equator there are calms, with rising air and heavy rains, particularly in the afternoons. These

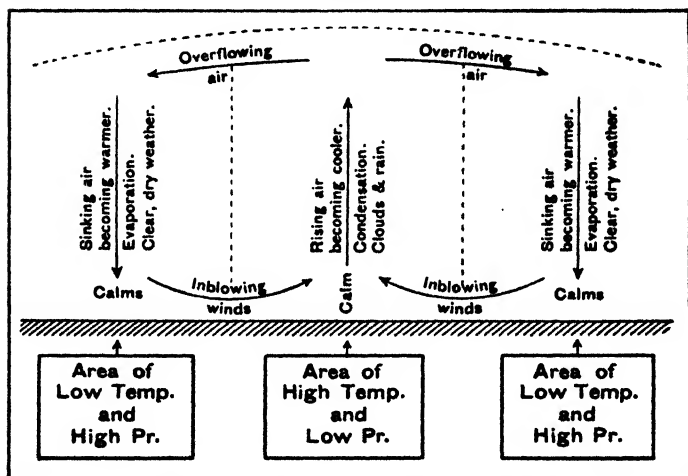


FIG. 16.—High and Low Pressure Systems.

conditions were described in the section on Africa, and are shown diagrammatically in Fig. 17, on p. 211, in the columns for April and October, where the equatorial region is marked as having rising air and the rainy area is dotted.

Into this equatorial region blow the winds from the higher pressure belts. As stated in the sections on Asia and Australia, because of the rotation of the Earth winds are deflected to their right in the northern hemisphere

and to their left in the southern hemisphere ; the trade winds therefore blow from the north-east and south-east respectively. Because the trade winds blow to a warmer region they become warmer and are therefore dry unless forced up over mountains. The drought is shown in Fig. 17 by the absence of dots where the arrows represent the north-east and south-east trade-winds between Lats. 10° and 30° north and south of the equator.

In the centres of the belts of high pressure (at about Lat. 30° N. and S.) there are areas of calms with sinking air and fine weather.

On the poleward side of each belt of high pressure there is another belt of low pressure, formed in a different way from that near the equator. The cause of these low-pressure belts is more difficult to explain, and here they can only be said to be due to a swirl in the atmosphere set up by the rotation of the Earth.

The effect is very marked, for winds blow out from the high-pressure belts towards these lower-pressure areas nearer the poles. In the northern hemisphere these winds blow from south to north, but being strongly deflected to their right they are south-westerly or almost westerly winds ; indeed they are commonly known as the westerlies, and are usually found from about Lat. 40° N. to Lat. 60° N. In the southern hemisphere the winds blow from the belt of high pressure towards the south polar regions, but being deflected to their left become north-westerly or almost westerly winds ; they are similarly known as westerlies and are found in corresponding latitudes. In Fig. 17 the position and direction of these winds are shown by the arrows near the top and bottom of the diagram.

The westerly winds are not as constant as the trade winds, for they are interrupted by frequent cyclones and occasional anti-cyclones. As was explained in the book

on the British Isles, the cyclones are low-pressure systems, into which air swirls and, in parts, rises; the rising air causes rain. The anti-cyclones are areas of high pressure where the air sinks down and the sky is clear. The cyclones travel along in the westerly winds, and so the belts of the westerlies obtain a considerable amount of rain. Note the dotted areas in Fig. 17.

The Belts of West Coast Regions.—As the belt of

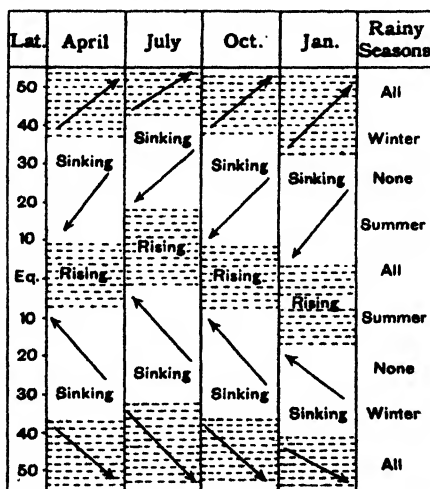


FIG. 17.—Wind and Rain Belts.

greatest heat swings northward and southward with (or soon after) the Sun, so the wind and rain belts swing north and south, but their movement does not extend so far. Thus although the overhead sun moves from the southern to the northern tropic, the central belt of calms and heavy rain does not reach the tropics; except in the case of the monsoon regions, which will be considered later, the central rainy belt does not affect areas more

than 20° from the equator at the most. Similarly, the dry belts of the trades and down-settling air do not move further than about 40° from the equator, and the swing of the rainy westerly belts is less marked.

The results of the swing are shown in Fig. 17, and can be studied from that diagram. Note particularly that the diagram shows why some regions have rain at all seasons, others in their summer, others in their winter, while some are rainless. It should also be noted that there are no definite and constant limits to the regions of rain and drought; as a rule one region shades off almost imperceptibly into another.

Nor are the latitudes given in the diagram to be applied to all parts of the world. The limits shown would apply fairly well to the conditions of the western parts of Europe and Africa, Australia and North America. In South America, however, the great wall of the Andes causes a very considerable northward extension of the desert region, as was stated in the section on South America, because the trade-winds give up all their water-vapour in rising over the eastern slopes of the mountains.

The main causes of the climates of the western regions of the continents have now been given, but the eastern regions require further explanation.

The Belts of East Coast Regions.—Except in the case of Asia, the eastern parts of the continent may be regarded as in the same belt system of winds and calms, but there are modifications to be considered. In the first place, the trade-wind belt is frequently a region of rain, for the trade-winds come from the north-east and south-east, and therefore come from oceans to the east coasts of the continents. If these coasts have highlands behind them, as is markedly the case in the three southern continents, the trade-winds are forced to rise, they are

cooled, and the water vapour evaporated from the oceans is precipitated upon the land. Therefore, in the latitudes of about 20° to 30° , where the west coasts are desert the east coasts have fairly heavy rains, which become less after the winds have passed the coastal region.

Similarly, the region of descending air at about latitude 30° is not one of drought, for there are times when the cyclones of the neighbouring westerly winds break into this high-pressure belt. The cyclones give rain along their track, and, in addition, as they draw in air from the ocean they bring to the lands water-vapour which is condensed in the coastal region. (Even on the west coasts of the continents, the region of descending air is invaded by these cyclones travelling out of their usual track, so that it is the trade-wind region rather than that of the descending air which has drought.)

The Monsoon Systems.—These have been explained in the section on Asia, and only one or two points need here be added.

In the first place, it may be pointed out that the summer monsoon system of Asia may be thought of as an exaggeration of the normal swing of the central hot and rainy belt. (Study the map in Fig. 18 (p. 214), which shows the pressures and winds for July.) Over Asia in July, the low-pressure system swings northward to far beyond the tropic and at the same time the pressure becomes lower than at any other part of the world, thus a "patch" of very low pressure occurs in this region (marked "V L" for "Very Low" on the map in Fig. 18). As the pressure is lower in this patch than elsewhere, the winds blow in from all sides and the monsoon system is developed.

Over North America the "patch" is less marked (L for Low is put on the map), and the inblowing winds are

similarly less marked, but the rain-bearing winds blowing to the interior from the Gulf of Mexico should be noted.

The effect of the low pressures over Asia and North America is to break up the high-pressure belt over the continents and to leave only two patches over the two oceans, with their centres in latitudes 30° to 40° N. (see H for High on the map); from these areas of high pressure the winds go outward in a kind of swirl.

In July the belt of high pressure in the southern

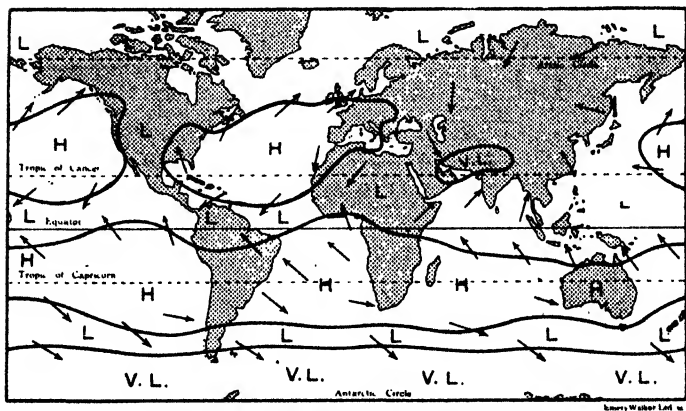


FIG. 18.—Pressures and Winds for July.

hemisphere extends right round the world, and the belt system of pressures and winds is therefore clearly seen south of the equator.

Just as the low pressure of the summer monsoon of Asia may be regarded as an exaggeration of the low-pressure belt, so the high pressure of the winter monsoon of Asia may be regarded as an exaggeration of the high-pressure belt, which here becomes a "patch" of exceptionally high pressure with the usual accompaniment of outblowing winds and dry weather. (See the January map of pressures and winds in Fig. 19, p. 215.) The area

of high pressure over America is less marked, but it has sufficiently expanded, together with that over Asia, to break up the most northerly low-pressure belt into two patches, which remain over the North Pacific and North Atlantic Oceans.

In the southern hemisphere the heat over the land areas has caused an expansion of the equatorial low pressure southward over the continents so that the low pressure has broken through the high-pressure belt of latitudes 30° to 40° S., leaving only patches over the

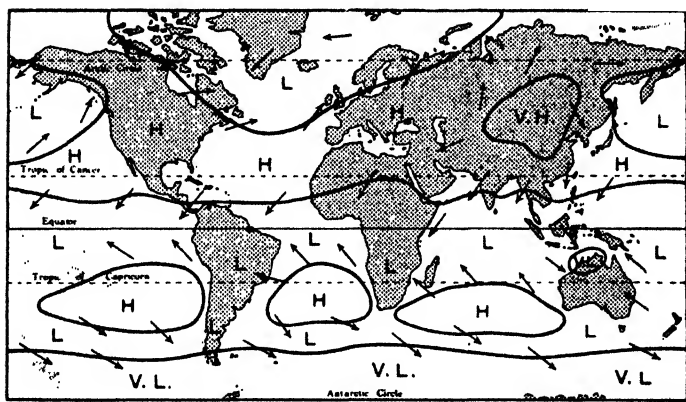


FIG. 19.—Pressures and Winds for January.

oceans. Nevertheless, on the whole the belt system of winds and pressures can be seen in the southern hemisphere. Northern Australia is the only region where a very low pressure (marked V. L.) is set up, and is the only region which can be said to have a monsoon system.

Figs. 18 and 19 are simplifications of the pressure and wind maps, which should be studied more carefully from an atlas.

Little need be said about the climates of the central regions of the continents, beyond the explanations

given in connection with the separate continents. It should be noticed that the aridity and the extreme temperatures of these regions increase according to the distance from the ocean and to the extent to which interior basins are enclosed by mountain barriers.

The Oceans.—The belts of winds and calms, with the consequent belts of rainfall, are clearly marked over the oceans. The diagram in Fig. 17 (p. 211) may be applied to most oceanic regions (as may be seen by comparing it with the maps of Figs. 18 and 19), and sailors give special names to particular areas shown in this diagram. Thus the region of calms near the equator is known as the Doldrums; the high-pressure belts, with sinking air and calms or light winds, are the Horse Latitudes (said to have been so named by Spanish sailors who were becalmed and had to throw overboard their horses); the latitudes between 40° and 50° , where the strong westerlies and cyclones are found, are called the Roaring Forties.

The rainfall belts affect the saltness of the sea; the salinity is increased where there is little rain and much evaporation, as in the dry, hot Horse Latitudes; it is decreased where there is much rain and less evaporation, as in the wet, cool belts of the westerlies.

The winds have a great effect upon the oceans, for they are the chief cause in setting up the system of ocean currents. The steady north-east and south-east trade winds cause a drift of surface water in their direction, that is from east to west. Thus are set up the north and south equatorial currents (see Fig. 20 on p. 217), and as these are driven somewhat towards each other there is a tendency to heap up some of the water in the central area. This excess water between the main currents is forced back from west to east and forms the equatorial

counter-currents. (Find these currents on the map in the atlas.)

The main mass of surface water is drifted against the eastern coasts of the bordering continents and deflected to the right in the northern hemisphere, and to the left in the southern hemisphere. Thus it skirts these eastern coasts, going northward in the northern hemisphere and southward in the southern hemisphere until it reaches the belt of the westerly winds. There, eastward currents

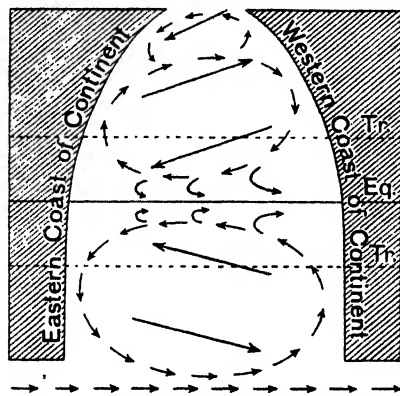


FIG. 20.—Winds and Ocean Currents.
(The longer arrows indicate the pre-
vailing winds; the shorter arrows
indicate the ocean currents.)

are set up which traverse the ocean until brought up against the western shores of the bordering continents. The Kuro Shiwo current of the North Pacific, and the Gulf Stream Drift of the North Atlantic, are examples of the eastward currents. Near the western shores of the continents, the water is again deflected to right or to left according to the hemisphere, so that in the northern hemisphere it sets to the southward, and in the southern hemisphere it sets to the northward. Important examples

of these latter currents are the Benguela current off western South Africa and the corresponding one off South America. The northward and southward drifts along the western coasts join the main equatorial currents and so complete circuits are set up. Compare the diagram of ocean currents with those of pressures and winds for January and July (Figs. 18, 19, and 20).

In the extreme north of the Pacific and Atlantic Oceans there is a smaller circuit. Some of the water from the Gulf Stream Drift and the Kuro Shiwo Current turns northward after reaching the western coasts of Europe and North America respectively, and complete circuits are caused by north-east winds which frequently blow from the Arctic Regions. Thus are formed the Labrador Current and that off Northern Japan.

Irregularities in the shape and extent of the continents modify the great systems of ocean-currents, but on the whole those described are characteristic of the Atlantic, Pacific, and South Indian Oceans. The part of the Indian Ocean north of the Equator has a reversal of currents set up by the reversal of the monsoon winds. All these currents should be studied on the maps in the atlas, and carefully compared with the maps showing the prevailing winds.

The effect of certain currents warming or cooling the lands towards which they flow, according as they bring warm or cool water, has already been pointed out. In revising the characteristics of the natural regions of the world (dealt with in the following section) the influence of all the currents, together with that of the winds, should be taken into account.

THE NATURAL REGIONS OF THE WORLD

What is a Natural Region?—In dividing the continents into natural regions, climate has been seen to be one of the chief factors, both because it is in itself an important characteristic of a region and also because it influences other conditions such as the natural vegetation. Other important physical factors are the structure and relief, and for similar reasons; *e.g.* the existence of mineral deposits and the character of the soil depend upon these factors.

In addition to such physical conditions, we must take into account the people of the regions. They may retain the natural vegetation, or they may replace it by cultivated products; they may or may not utilise the mineral deposits and the fertility of the soil. Thus there may be two regions similar in their natural possibilities but very different in their actual conditions. Therefore, even if we do not wish to study the people of a region we cannot neglect their influence on the region itself.

But it would be a very incomplete study of the geography of a region which did not study the people themselves. The phrase "natural region" does not imply merely "physical region"; the word "natural" is used not as opposite to "human," but as opposite to "artificial" or "political," for a natural region is one which ignores the artificial, political boundaries which men have set up between their provinces or countries.

A natural region is therefore one which has definite characteristics of its own marking it out from neighbouring

regions, and these characteristics are both physical and human. In one sense the people are a part of a region, inseparably bound up with the other parts. They are influenced in many ways by their physical environment, and in turn they modify and sometimes even transform that environment. How different, for example, was the densely populated manufacturing and trading district around Chicago less than a hundred years ago !

From one point of view the people of a region may be regarded as the most important element in the whole of the phenomena of a region, and one of the chief values in the study of geography is that it shows us the nature of the peoples of the world.

Therefore, in describing and in marking-off natural regions, we must consider climate, structure and relief, natural vegetation, minerals and soils, and also the people with their characteristics, their occupations and ways of life, their utilisation of the natural resources of the regions, and the changes they have made in their environment.

The Grouping of Natural Regions.—It has already been pointed out that there are similarities between certain natural regions in one continent and those in corresponding positions in other continents, and it is now possible to survey the world as a whole and to arrange the natural regions into groups in such a way that all the regions in any one group resemble one another. Thus, there is a group of regions situated near the equator which have as common characteristics a climate of almost constant heat and rain and a natural vegetation of dense equatorial forest and jungle.

In the maps of the natural regions of the world (Figs. 21 and 22, on pp. 234 and 235), the various regions of this group are marked by the letter A ; Regions A1 and

A₂ are in the Western Hemisphere, and the corresponding regions A₃, A₄, and A₅ are in the Eastern Hemisphere.

Yet to group in this way all the regions distinguished in the separate continents, and to compare and contrast those of each group with one another, would be a long task, and in this book the work is simplified by leaving out some of the less important divisions between the natural regions of each continent. For example, in South America south of the Amazon Forest Region, three regions are separated from one another in Fig. 10, p. 173, and called the Brazilian Highlands, the Amazon Savannas, and the Parana-Paraguay Savannas respectively. The descriptions given in the section on South America showed that these were alike in having a hot, wet summer followed by a cooler dry season, and a natural vegetation of tropical grassland but with a varying amount of tree growth. In the present section the three regions are grouped together, and to them have been added the coastal lowlands of south-eastern Brazil, although the climate and vegetation of this last region is of a rather different type. The combined area can, however, be described as having certain conditions in common, and the separate parts are closely related to one another; this larger region is therefore now treated as a unit, marked as Region B₃ on the map of the natural regions of the world on p. 234, and it is compared and contrasted with other large natural regions of the same group.

Even where the regions considered in this section have not been formed by uniting two or three of those previously separated, they are not uniform throughout their area. Consider, for example, the region in which the British Isles is situated, and think of the difference between the Scottish Highlands and the London Basin; such differences must exist within every large natural region. Yet, on the other hand, there is far less difference

between the Scottish Highlands and the London Basin than there is between the Scottish Highlands and the Congo Basin. Hence it is useful to make the broad divisions into natural regions in order to give general ideas, but at the same time it must not be forgotten that there are variations within each region.

Comparison and Contrast.—The larger natural regions of the world must be studied in a twofold manner ; they must be first compared to see their similarities with one another, and then contrasted to realise in what ways they are different from each other. The reasons for the similarities will usually be found in their position on the globe, on which their climatic conditions largely depend. The causes of their dissimilarity are usually the differences in their structure and their relief, for these conditions greatly affect the character of the inhabitants and their work.

The accessibility of a region is a most important matter. If it is easily reached, for example by means of seas and rivers, peoples from other regions may have entered it again and again, each immigration bringing some contribution of knowledge to the development of the region. If the region is difficult to enter it is likely to remain undeveloped. The accessibility of the Amazon Region is strongly contrasted with that of the East Indies Region, and will be discussed in succeeding paragraphs.

The effect of differences of relief in modifying climate and consequently other conditions, need not be further emphasised ; similarly differences of structure, with their determination of mineral deposits and therefore possibilities of economic development, have obvious influences in causing contrasts between regions which are alike in climate.

Each of the groups of natural regions will now be

considered in turn, and the characteristics of the separate regions reviewed from the double point of view of comparison and contrast.

The Equatorial Forests and Jungles.—These regions are marked A1 to A5. They are alike in their position, as they are situated within about 10° of the equator, and they all have a climate similar to that of the Cameroon region, shown in Fig. 2, p. 19, with a high, equable temperature and rain throughout the year. Except in the mountain areas included in these regions, the natural vegetation is of the dense kind, described in the section on equatorial Africa. There are countless varieties of trees, from some of which rubber, dye materials, and hard timber are obtained, while valuable palms grow in the coastal regions. The transplanting of trees, *e.g.* the Para rubber tree, from one region to another, tends to a uniformity of products throughout the group.

Man does not easily succeed in living in these regions. On the whole, the native inhabitants are few in number and of an undeveloped type; a large proportion of them are primitive hunters or fishers, and the clearings of those who practise a simple form of agriculture are merely tiny specks in the immensity of the natural forests and jungles. White men find it impossible to live permanently and difficult to live even for a time in these hot, steaming, fever-haunted regions. Their plantations have to be worked by native labour, and the extent and success of the cultivation depends largely on the state of development of the native peoples. Cacao and manioc may be considered characteristic products of the equatorial plantations, for they are very little grown outside these regions. Sugar, rice, and bananas are largely grown in the lowlands, and coffee can be obtained from the uplands.

Yet because of differences of position and relief, these

regions are inhabited by very different peoples, and are to be contrasted rather than compared in the degree of their economic utilisation.

In South America the North-western Coastal Region (A₁) is easily accessible by sea and has been developed by the Spaniards and their descendants. The neighbouring highlands afford a home for the people who govern the whole region and to some extent organise the work of the lowland areas. Moreover, these areas are restricted in area ; where necessary, they can be drained and the unhealthiness can be relieved, while the sea-winds render the climate more bearable.

To some extent the coastal plains of the Guianas and the Amazon Region (A₂) also enjoy the advantages of a position by the sea, but the great expanse of the Amazon valley is more inaccessible and unhealthy. Consequently most of the people are native Indians who have either remained there undeveloped while higher types have occupied better areas, or they are tribes of relatively weak and backward people driven by stronger and more able ones into these least desirable districts of the continent.. White men cannot settle in the region, and the highlands, where the governing classes of the countries live, are far distant. Draining the great flooded areas is impossible, and relatively little can be done to improve health conditions. Consequently the Amazon lowlands as a whole are one of the least populated and least utilised regions of the world. Their super-abundance of water makes them as useless to man as the deserts where water is lacking, and their constant heat is almost as inimical to human life as the constant cold of polar regions.

The Guinea Coastlands of Africa (A₃) are closely comparable with the North-west Coastlands of South America, but the African lowlands are governed by Europeans who do not live in neighbouring highlands

but keep in close touch with the region by sea communications.

The Congo Basin compares in situation with the Amazon Valley, but is unlike it in relief and structure. The Congo River is interrupted by falls, but railways have supplemented the river ways, and the region as a whole is higher and better drained. The forests are, in large part, less swampy and less dense than those of the Amazon region, and clearings are more easily made. Therefore, although the Congo Basin has only recently been acquired by Europeans, it will probably be developed before the valley of the Amazon. The natives of the equatorial region of Africa are more numerous than those of South America, and although some of them are among the most primitive of the peoples of the world, others (generally relatively recent immigrants) are of a higher type than those of the American region.

The Zanzibar Region (marked A₄) is very similar in most ways to the Guinea Coastlands, and like them it is governed by an overseas power, but because of its position on the east coast of Africa, there are two elements in the coloured population which do not exist on the "West Coast." These elements are formed by the Arabian and (East) Indian traders and settlers who can live and work in the region, and yet have ways of life different from those of the negroes. In the book on the British Empire it will be shown that the existence of these alien elements has introduced problems of government different from those of West Africa.

The East Indian Island Region (including Ceylon), marked A₅, is the most favoured by nature of the equatorial group. The tempering influence of sea-winds is felt everywhere, and there are no very great expanses of unhealthy swamp-land. Everywhere are highland districts, which are productive and at the same time are

the homes of more virile peoples than those of the lowlands. Further, the sea has given access to immigrants from several parts of Asia, for example, the Arabs, Hindus, and Malays, who have greatly raised the level of the native populations of some of the islands. Consequently the European masters have found it possible to develop the plantation system here more than elsewhere. This region, or at least the eastern portion, is therefore more densely populated, more productive, and more prosperous than those of equatorial America and equatorial Africa.

The Tropical Savanna and Plantation Lands.—

Taken as a whole, the regions marked B₁ to B₉ on the maps lie between the equatorial regions and the tropics. As the belt of the overhead Sun approaches these regions they have exceedingly hot weather (see again the temperature curve for the Sudan Region in Fig. 2, on p. 19); the heat is afterwards moderated by heavy rainfall which occurs when the Sun is overhead or nearly overhead at midday. When, six months later, the overhead Sun has returned to the opposite hemisphere these regions have a cooler and dry period.

The season of heat and rain is the season of growth for the grasses which form the natural vegetation of the greater part of the areas considered. Where the coastal or highland districts receive unusually heavy rain, or rain for an unusually great proportion of the year, dense jungles or even forests replace the more open grassland. On the drier savannas cattle-rearing is the commonest occupation; in the better-watered parts there are plantations yielding sugar, rice, cotton, maize, etc.; while from the hill slopes tea, coffee, and timber are obtained. It may be observed that in several of the less developed of these regions attempts are now being made to introduce

or extend the growing of cotton, because of the increased demand for this material.

The differences between the various regions of this type are very marked. The Central American and West Indian Region (B₁) resembles the East Indian Region in being exposed to sea influence, in having much high-land, and in being easily accessible. Consequently it has been more highly developed, is more densely populated, and is more productive than the corresponding South American Regions.

The Llanos and Guiana Highland Region (B₂), enclosed by mountains or unhealthy swamps, is relatively inaccessible and is therefore the least developed region of this group.

The Brazilian Savanna Region (B₃) (which may be so-called if it is remembered that the south-western part of it extends beyond Brazil) is similarly inaccessible and undeveloped in its western portion, but the part bordering the Atlantic is productive and well populated, both the coastal lowlands and the plateau behind Rio de Janeiro and Santos being important agricultural districts. The high regions of Brazil on and south of the tropic are suitable for white occupation, and may therefore be compared with the high African region (B₅).

The Sudan Region (B₄) changes gradually from a semi-arid scrubland in the north to a well-watered jungle land in the south, but from east to west the physical conditions vary little. There is much more variation to be seen in the people of the region, when districts lying east and west of one another are considered, and it has already been pointed out that in the central part, Nigeria, there are more highly developed native communities, and consequently there is a denser population than in the eastern and western parts of the region.

The East and South African Highlands (B5) are cooler because of their elevation, and consequently, as far as climate is concerned, they are possible regions of occupation by white people. This occupation is unlikely to occur within the rugged and settled Abyssinian Highlands, but the plateau regions further south are only scantily peopled by Bantu negroes, who are largely nomadic, and Europeans have acquired and are beginning to occupy these territories.

The Mozambique Region (B6) is hot lowland where white men, who numerically form a very small proportion of the population, own plantations.

Madagascar (B7) is put as one region in the map of natural regions in Fig. 22, but the differences which, in the section on Africa, were pointed out as existing between its various parts must not be forgotten.

The South-eastern Monsoon Lands and the Philippines (B8) are sufficiently alike to be grouped together, and it should be carefully noted that the arid region of north-western India is excluded.

Yet the relief of the land within the area included varies considerably, and there are consequently considerable differences in the amount of the rainfall and in the natural vegetation. There are no extensive areas of savanna land where cattle-raising is the chief occupation, but on the whole forested highlands alternate with agricultural lowlands.

Because the people of most of the region are intelligent and hard working, and because near this region ancient civilisations developed, the agricultural resources of the soil have been utilised more thoroughly here than elsewhere in the same group of natural regions. There are highly developed communities, with many arts and even literatures, there are great cities, there is much trade and intercourse with other regions, and as

a whole the region is one of the most densely populated in the world.

Similar in physical conditions, but totally different in its human geography, is Northern Australia (B9). Until about a century ago, the only people who had penetrated this region were the backward Australian aborigines, and the acquisition of the whole continent by the British has prevented recent settlement by Asiatics, while white people have entered in very small numbers. Consequently it is largely an "empty" land from the point of view of population, and its great potential resources are undeveloped except in the south-east of the region.

The Arid Regions.—These regions, marked C on the maps, are characterised by a lack of rain. Broadly speaking, they are situated at about latitudes 20° to 30° on the western sides of the continents, and have an extension inland where mountain barriers or great expanses of land shut them off from oceanic influences.

Differences in latitude and in elevation cause them to have widely different temperature conditions ; as examples of this contrast the temperature graphs for Bagdad in Fig. 5, p. 67, for the Sea of Aral in Fig. 6, p. 72, and for Idaho in Fig. 9, p. 156.

The water supply also varies, and according to its character various ways of living are possible. In some parts a scanty rainfall gives a scanty supply of pasture on which a small number of nomadic herdsmen keep their animals. Elsewhere, rivers from bordering highlands give water used by agriculturalists to irrigate their crops ; in such areas considerable populations may live, and important civilisations have developed. In other parts, minerals have attracted people to the deserts, and the mining populations have to live with the aid of water brought from neighbouring regions.

All these means of obtaining a living are practised in the North American region, C₁, and the population, though scanty, is widespread. In the coastal desert of South America, C₂, the populated areas are merely narrow strips by the rivers which cross the desert from the Andes to the sea.

The Sahara Region may be considered as extending across the Red Sea to Arabia, and even across the Arabian Sea to North-western India. This great desert area of the Old World is shown on the map as one region, marked C₃. In the higher parts, and on the margins of the Sahara and Arabia there are nomadic herdsmen ; there are a considerable number of cultivators in the scattered oases of the true deserts ; there are also caravans of traders, but the overwhelming majority of the population of the region depends upon irrigation in the three districts of the Nile, Mesopotamia, and the Indus. Thousands of years ago civilisations developed in Egypt and Mesopotamia, and later upon the upper part of the Indus plains, while in recent years engineering under the direction of Europeans has renovated, improved, or initiated irrigation systems in each of the three districts. Many products can be obtained from these irrigated lands, and wheat, cotton, and fruit are exported in increasing amounts.

The Somali Region (C₄) is, for the most part, scrubland rather than desert, and with it may be grouped the neighbouring Yemen district which is less arid than the rest of Arabia.

The desert and scrublands of South Africa (C₅) are relatively of little value. Consequently the region is almost unpopulated. It is occupied only by the poorest type of natives, driven there from the better regions around.

The South-western Uplands of Asia (C₆) form a break

between the more arid regions of Arabia and the Caspian-Aral depression. Poor pastures in the interior of the plateaus and streams from the mountain borders give a living to more people than in any other of the arid regions (except on the three great irrigated plains of the Nile, Mesopotamia, and the Indus). The south-western uplands of Asia are therefore mainly scrubland, with relatively small areas of true desert in Persia.

The Caspian-Aral depression (C7) is a desert, with oasis settlements by the streams which come from the highlands on the southern and eastern side of the region, and certain of these settlements have developed into trading towns of considerable size linked to the markets of Europe by railway communication.

The Central Ridges and Basins of Asia (C8) have a distinctly colder climate than the other arid regions, partly because they are farther north and partly because of their elevation. Through this region pass caravan routes from the populous and productive lowlands of China, and there are consequently centres of caravan trade, while the better-watered parts of the basins are poor pastures.

The arid region of Central Australia (C9) has neither caravan trade nor oasis settlements. It is traversed by a railway near its southern margin and there are stock routes by which cattle are driven from the savannas in the north to populated areas in the south, but most of the activities of the region are connected with the gold deposits, which are greatest in the south-west. Here there are large settlements obtaining water by pipes from the south-western margins; even the railway and the stock routes are largely due to the demand for communications and food on the part of the mining communities.

The Western Warm Temperate Margins.—These

regions, marked D₁ to D₅, are situated on the western sides of the continents about latitude 30° to 40° on either side of the Equator. They have the "Mediterranean" characteristics of a mild and equable climate with winter rain and summer drought, a natural vegetation of ever-green shrubs and trees, and a group of cultivated products in which fruits of the olive, orange, and vine take an important place.

Man has taken advantage of the similarity of climate in these regions to transplant several of the useful plants from one area to another, *e.g.* the olive tree is now to be found in all of them, and wine is made and exported from them all. The Mediterranean region of Europe, Africa, and Asia was the one in which these plants (or the more desired varieties of them) were first obtained and consequently the tendency has been to bring the other regions into line with that one; yet the reverse process has gone on to some extent, *e.g.* eucalyptus trees from the Australian region have been planted in large numbers in Palestine.

It is probable that in course of time, when all these regions have been fully developed, they will show a greater similarity in their products than they do at present, and that in consequence the occupations and ways of life of the inhabitants will become more alike.

As the products of the regions are largely of the "luxury" type, they are mainly exported in exchange for other goods, and consequently there is much commerce in the regions of this group.

The chief differences between the regions depend upon the relief and structure of the respective continents. California and Central Chile (D₁ and D₂) are restricted to narrow strips by the continuous fold-mountains which girdle the Pacific; the Mediterranean Region (D₃) penetrates far into the great land mass of Eurasia and North Africa because of the subsidences accompanying

the formation of the fold-mountains of that region. The Cape of Good Hope Region and the South-western Margins of Australia (D₄ and D₅) occur where a subsidence of the southern part of the continents has allowed the ocean to extend eastward, and consequently the regions themselves have a marked extension eastward bordering the great Southern Ocean.

It should be observed that on the landward side of four of the regions (D₁, D₂, D₄, and D₅) there are highlands or plateaus from which gold and other minerals are obtained, and that these minerals are exported through the ports of the marginal areas. Also, in the Americas trans-continental lines reach the Pacific Ocean through these regions, while the Mediterranean Sea is one of the great traffic ways of the world. Therefore, both because of this through-trade and also because of the sale of much of the produce of the "Mediterranean" type, commerce is a characteristic feature of the life of these marginal areas.

The Eastern Warm Temperate Regions.—Although these regions, marked E₁ to E₅, are in somewhat similar latitudes to those just considered, their position on the eastern side of the continents allows them to receive rain from the ocean winds in summer. Contrast the rainfall graphs for Gibraltar and Shanghai in Fig. 5, p. 67. The temperature graphs for the same places illustrate the further fact that although the eastern regions have a cooler winter they have a hotter summer, and the combination of heat and rain in the summer season makes possible great growth in the vegetation. Hence the natural vegetation is of a relatively luxuriant type, largely forest, and cultivation gives abundant return for labour expended upon it. Hence the regions of this group are very fertile, yielding cotton, sugar, rice, maize, and wheat,

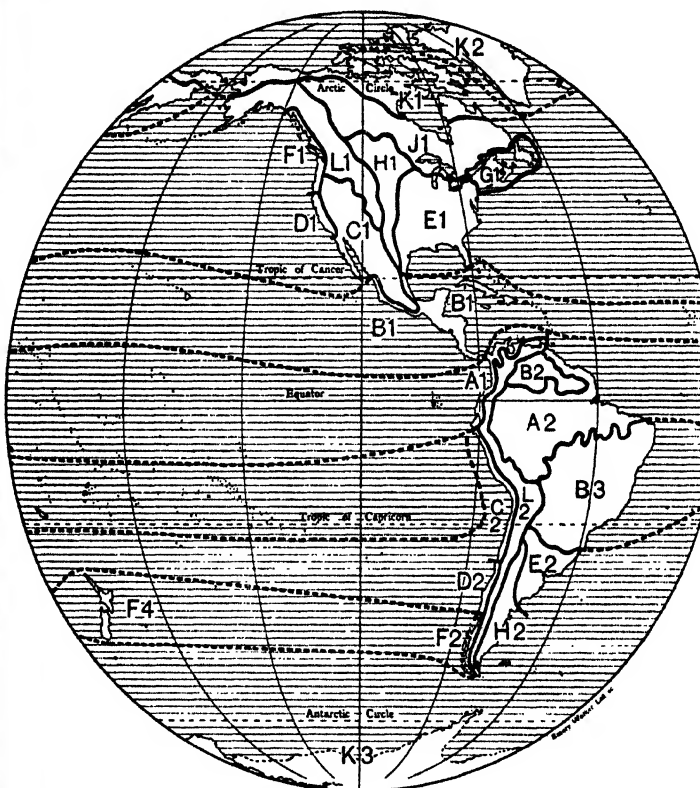


FIG. 21.—The Natural Regions of the World (Western Hemisphere).

- A. The Equatorial Forests and Jungles.
- B. The Tropical Savanna and Plantation Lands.
- C. The Arid Regions.
- D. The Western Warm Temperate Margins.
- E. The Eastern Warm Temperate Regions.

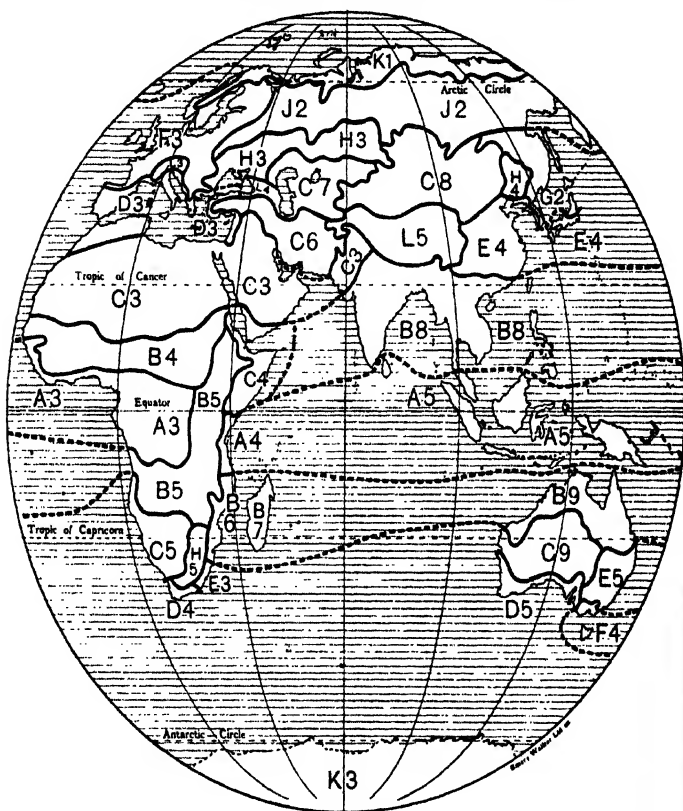


FIG 22.—The Natural Regions of the World (Eastern Hemisphere).

- F. The Western Cool Temperate Regions.
- G. The Eastern Cool Temperate Regions.
- H. The Temperate Steppe Lands.
- J. The Northern Forests.
- K. The Polar Regions.
- L. Mountain Regions.

and many other products for the use of man, as well as food for animals. Thus they are capable of supporting a dense population.

The seaward parts of the regions are the best watered and most productive, the interior areas are rather drier and support fewer people. In all of them commerce is carried on, and there are large or fairly large ports.

The differences between the regions of this group are due partly to structure, and the consequent existence of particular minerals, and partly to the types of people inhabiting the respective regions.

The Eastern United States Region (E₁) has large coal-fields and a certain amount of iron ore, and these have been utilised by the progressive Americans to carry on great manufacturing industries. Some of these industries are closely connected with the agricultural products of the region, as for instance the packing industries of the north and the cotton manufacturing of the south. The production of a number of the commodities is greater than required in the region and there is a large export trade, balanced by the importation of goods produced in other regions. Consequently, some of the greatest manufacturing and commercial cities in the world have arisen here.

The Pampas Region (E₂) has neither coal nor iron, and its people are not as enterprising as those of the United States. Its production is of a simpler character, being largely confined to grain and animal products.

The Natal Region (E₃) is a relatively narrow strip between the ocean and the high plateau. It has little mineral wealth to serve as a basis of manufacturing, and it has no great expanses on which cattle may be reared, but its terrace-like formation allows a considerable variety in its agricultural productions. The productions resemble those of China in including tea, sugar, and cotton, but the

quantities obtained are necessarily not great. It may be noted that the Natal Region differs from the others in being largely populated by negroes, though the considerable "coloured" population of the southern part of the United States must not be forgotten.

The outstanding fact in connection with the Chinese, Korean, and Japanese region (E₄), is that its people are Mongolian, and until recently were isolated from the rest of the world. Hence, the character of the people, the organisation of their communities, and to some extent the nature of the productions differ from those of the other regions of this group. Peculiar to this region is the great importance of rice growing, tea cultivation, and the rearing of silkworms; the overcrowding of the population and the absence of domestic animals are also noteworthy. The great mineral wealth of the region is only now beginning to be utilised and the industrial development of the region is still in its infancy. Trade is already great and there are already large ports, but the importance of commerce will doubtless increase with the development of manufactures.

The South-eastern Region of Australia (E₅) is as yet relatively unproductive and scantily populated, although it contains far more people than any other part of the continent. As regards the inhabitants, the Australian region is in striking contrast with the corresponding region in Asia and it may be most closely compared with the Eastern United States. The interior of the Australian region has a rather poor water supply and is not likely to be very productive; even when the coal and iron of Eastern Australia are utilised for manufactures, it is most unlikely to be the home of as many people as either of the similar regions in the northern hemisphere.

The Western Cool Temperate Regions. — These

regions, F₁ to F₄, are situated about 40° from the equator where the lands intercept the westerly winds from the oceans ; consequently they are not represented in Africa, which extends only to about latitude 35° S. The westerly winds are the chief cause of the equable, cool, and rainy climate which is the common characteristic of these regions ; see the graphs for Bordeaux in Fig. 6, p. 72.

The two American regions, like the warm temperate regions adjoining them, are limited to a narrow belt by the mountains behind, and their extent is further reduced by the subsidence of the Earth's crust which has resulted in the drowning of part of their valley lands. The North American region is the more important of the two, but even here the area of cultivable land is very small, and forestry, fishing, and mining are the occupations of a relatively large proportion of the scanty population.

North-western and Central Europe (F₃) is a very different region. A great lowland lies between the northern and southern mountain systems of Europe, extending into the interior of the Eurasian continent. Therefore, although much fertile land has disappeared by subsidence under the North Sea, the Baltic Sea, and the shallow waters of the Atlantic Ocean, sufficient remains to afford a living to large agricultural populations. Indeed, the extension of the area of the sea has resulted in the extension of its influences far into the continent, so that it not only affects the climate, but also the work of the people, as the shallow seas are very valuable fishing grounds, and the inland waters are great aids to communications and trade.

The greatest natural resource of the region is its mineral wealth. The coal, and to a less extent the iron, formed the basis of the great manufactures which developed here earlier than in any other region, and the manufacturing was accompanied by a great growth of

commerce. The increase in population stimulated greater activity in farming, and all these developments were assisted by the advance of science. The region became densely populated and almost every part was covered with a network of roads and railways.

Both before and after the Industrial Revolution, the great production and the large populations of the countries in this region gave them political power, and the states not only traded with other regions but acquired possessions in all the other continents. Hence this region of North-western and Central Europe has an importance by no means limited to its own area.

The last region of the group (F₄) includes New Zealand, Tasmania, and part of the State of Victoria in Australia. Indeed, it may be considered as including all the southern and highest part of the Eastern Highlands of Australia, for the elevation of this district (Mount Kosciusko reaching 7,000 feet) gives it a cool and rainy climate which requires it to be placed in the cool temperate rather than in the warm temperate region ; thus even the high south-eastern border of New South Wales is here included in this area.

In position, the Australasian region is almost the Antipodes of North-western Europe, and in its lack of industrial development it is equally opposed. The occupations of the people are of a simple type, for they are largely mining and farming, and the exports are of raw materials, while manufactured goods are imported ; consequently the population is scanty.

The heavy and almost constant rainfall on the mountains of the regions of this group will doubtless be utilised in the future to produce a great amount of water power ; in that event the industries, and the relative importance, of this group of regions will be considerably increased.

The Eastern Cool Temperate Margins.—There are but two regions of this type, G₁ and G₂, situated in about latitudes 40° to 50° on the eastern sides of North America and Asia respectively. They have warm summers with rain, and very cold dry winters; see the graphs for Vladivostok in Fig. 6, p. 72. They are naturally forested, mainly with coniferous trees, and only relatively small areas are cleared for agriculture.

The Northern Appalachian Region, G₁, is the more developed; the manufactures of New England have already been accounted for and the St. Lawrence Valley is important as being one of the chief gateways from the Atlantic into the densely populated interior of North America. Because this region lies between Europe and an important part of North America, its accessibility is great and is therefore a large factor in its development.

The Amur and Japan Sea Region, G₂, has been remote from the more advanced parts of the world, until the recent rise of Japan. The Amur Valley is indeed one of the chief gateways from the Pacific into the interior of Asia, but that interior is itself of little importance. Consequently this north-eastern margin is not as important as the corresponding region in North America.

The Temperate Steppe Lands.—The common characteristic of these regions, marked H₁ to H₅, is a growing season of moderate heat and rain (see the graphs for Regina, in Fig. 9, p. 156), and their natural vegetation consists of short grass or low shrubs. The better-watered parts may be utilised for grain-growing; the more arid parts are poor pasture lands.

The Northern and High Plains of North America (H₁) have a fair amount of rain in their north-eastern portion where the great and fertile wheatfields are situated, but their western areas are largely used for rearing cattle and

sheep. Beneath the soil of the northern part are great deposits of lignite or brown coal, which may one day be used as the basis of manufacturing industries.

The Patagonian Region (H₂) is a poorer country and agriculture is carried on to a smaller extent ; parts of the region are semi-desert and the population is very scanty.

The Steppes of Eurasia (H₃) are very productive in their western portion, where they include the fertile "black earth" of the Ukraine ; here the farming is of a varied nature and the population is considerable. Coal and iron in the same area are now beginning to be utilised in industrial towns. The eastern portion has less rain, and its remoteness from the more advanced parts of Europe has retarded its development ; it is therefore scantily populated.

The Manchurian Basin (H₄) largely owes both the deficiency of its rainfall and the lateness of its development to its enclosed and more or less isolated position. The development of its agricultural and mineral resources has now been begun by the Japanese, and there is no doubt that its transformation into a productive and populous region will be relatively rapid.

The Karroo and Veld Plateau Region (H₅) remained a scantily populated pastoral and farming area for long after it was settled by Europeans, but the discovery of gold caused a great immigration of people and many changes in the region. Its importance is still due largely to its mineral wealth, for much of even the agricultural development has been to satisfy the requirements of the mining and trading communities. As in the other regions of South Africa, the political and economic predominance of the white men clashes with the numerical predominance of the black population, and the problem thus caused affects the lives of the people in many ways.

The Northern Forests.—The climate of these regions, J₁ and J₂, is characterised by a very cold and long winter, and a summer of moderate warmth and moderate rainfall. See the graphs for Lake Athabasca in Fig. 9, p. 156. The forests are mainly of coniferous and birch trees, and are as yet little cleared for agriculture. There is mineral wealth both in Canada and in Siberia; mining is not important, however, except near the Great Lakes of America. Even the timber has not yet been utilised over large areas because of the difficulties of transportation. Only in the eastern part of Russia in Europe and in the neighbourhood of the Great Lakes in America is there any considerable settlement.

The Polar Regions.—The tundra lands of America and Eurasia (K₁) may be considered as one region, for they border the Arctic Sea and are scarcely broken by the narrow Bering Strait. They have been sufficiently described in preceding sections and here it need only be pointed out that with them are included the Scandinavian highlands and the northern part of the Ural Mountains, whose elevation prolongs into warmer latitudes the climatic conditions and the natural vegetation of the Arctic lowlands.

The ice-covered plateau of Greenland (K₂) is marked off as a separate region because of its height, and it may be compared with the similarly ice-covered plateau of Antarctica (K₃).

Mountain Regions.—These regions, L₁ to L₅, stand out from those around them because of their height, and they are therefore considered as separate regions.

Yet there is little uniformity in any one of them, for each of them includes both ridges and valleys, while the Rocky Mountain Region, the Andean Region, and the

Central Asian Highlands have great enclosed plateaus whose characteristics are very different from those of the higher mountain borders. Therefore it is not possible to describe any one of them in terms which would apply to all its parts.

Similarly, it is not possible to indicate many similarities which would apply to all the regions. For example, the mineral wealth of the Rocky Mountain Region may be compared with that of the Andes, but there is very little mineral wealth in the Alps.

The chief points of likeness are the great *average* elevation, the consequent cool or cold climate over large areas, their scanty population, and the difficulty which they oppose to communications. Mountain regions prevent, rather than encourage or aid, most of man's activities; hence within their borders human life is restricted not only as regards numbers but also as regard means of occupation and ways of life. Mountain regions therefore have a negative influence, as contrasted with the more positive influence of man's environment in lower regions, where favourable and varied natural conditions offer to man many occupations and differing ways of life in which his development is made possible and stimulated.

SOME WORLD PROBLEMS

Early developments in Europe.—Most of the great problems concerning the world as a whole are connected with those movements of Europeans into other continents which have taken place during the last four centuries.

Until the period of the great discoveries which first opened the seaway round Africa to the East and immediately afterwards disclosed the New World to the Old, the people of Europe had had little influence beyond their own continent. Indeed, until that time Europe received rather than gave, for civilisation extended from the valley of the Nile and Mesopotamia into Mediterranean Europe, while later influences, such as those connected with the spread of the Christian and Mohammedan religions, came from Western Asia and Northern Africa.

The Mediterranean Region offered abundant opportunities for man's development. Settlements arose at various points on its fertile shores, and the relatively sheltered seas allowed the communities to keep in touch with one another. Before the time of Christ, in the small "city-states" of Greece men found leisure to think and thus to lay the foundations of science; they also carried certain arts, particularly those of sculpture and architecture, to a height which has never been surpassed. Later, the great Empire of Rome united practically the whole Mediterranean region under one government, by means of which peace and law were enforced, great roads and harbours were constructed, and trade developed.

The break-up of the Roman Empire was in part

brought about by incursions of nomads from the steppelands of Europe and Asia. The effect was both direct upon the Roman lands themselves, and indirect upon the people of the forests of central Europe, who were thrust westward and southward upon the Roman dominions.

But though the barbarians brought about the downfall of Roman civilisation, yet in time civilisation conquered the barbarians, and the more fertile parts of the forest lands of Central Europe were cleared, crops were grown, metals were mined, roads were made and cities were built, while people of the German states added their contribution to that of the Mediterranean countries, Spain and Italy, in the growth of science, literature, art, and music.

Meanwhile North-western Europe was similarly transformed, and the peoples of France, the British Isles, and the Scandinavian states played their part in the developing civilisation.

Although the European people were mainly self-supporting, trade in certain luxuries was carried on with Africa and Asia ; gold, ivory, and precious stones, fine silken clothing, spices to relieve the rather monotonous food of the Middle Ages, were brought to Europe by traders with great risk and trouble, and correspondingly high profits.

After the land-route to Southern Asia was stopped by the conquest of Constantinople by the Turks in 1453, the route round Africa took its place, and the attempt of Columbus to find a sea way to the Indies led to the discovery of the Americas, in 1492. For a time the chief effect of these discoveries was to increase the amount of trade in such articles of luxury as those already obtained, but in order to get these things from the natives, the Europeans took possession of trading centres, fertile

lands, and mining regions. In this way were established the British rule in India, the Dutch rule in the East Indies, that of the Portuguese in Africa and South America, and that of the Spaniards in Central and South America.

The Migration of Europeans.—The sixteenth century was therefore one of discovery leading to colonial trade and conquest. In the seventeenth, eighteenth, and nineteenth centuries, these activities were slowly continued, and in addition there was a migration of European people to the temperate regions of the newly discovered and scantily populated continents. North America was most easily reached and first developed; the temperate lands of South America were more distant and are more thinly peopled; South Africa and Australia have still very few white inhabitants as compared with their extent and possibilities.

Many motives prompted the emigration of the Europeans. Some went to escape religious persecution or political oppression, some to find excitement and adventure in strange lands, some to get wealth quickly by obtaining gold or diamonds; some hoped to get profits from plantations worked by coloured men, while others, driven by poverty in their own lands, were willing to toil as labourers in mines, fields, and cities.

In the middle and latter part of the nineteenth century there was a great increase in the numbers of emigrant workers from Europe, for by that time the improvement of ocean transport had brought the new lands into closer touch with Europe, while the industrial revolution had made Europe more dependent upon products of other regions.

Both in North-western and in Central Europe the stores of coal and iron had become the basis of industries,

and large numbers of people worked in manufactures and in trade. The fields of Europe could no longer produce enough food for the increased population, but large steamships could now bring supplies cheaply across the ocean. Hence in distant parts there was opportunity for farming for the European market, and farmers and peasants from Europe found abundant land in the temperate regions of the New World and the southern hemisphere.

The emigration of the agricultural workers of Europe thus made possible the necessary importation of food for the industrial and commercial workers, and at the same time did something to lessen that inequality in the density of population between regions of similar productive capacities, which was pointed out in the preceding section. Part of the population of crowded Europe was transferred to the empty spaces in the other continents, and this process is still going on.

Yet although such a movement is in the long run beneficial, it may be difficult for an individual European peasant to get himself settled down and working successfully in a distant land. Some assistance has often to be given, particularly to the poorest people, and co-operation between the states of Europe and the overseas countries is desirable. The co-operation between the governments of Britain and the self-governing Dominions of the British Empire has made the migration much more satisfactory and beneficial to people within the Empire than has been the case with many of the emigrants from Central and Eastern Europe to North and South America.

In the case of the British emigrants, they have been able to go to British Dominions and remain citizens of the British Empire, but that is not possible for emigrants from the European states which have no colonies in temperate regions. Before the war, Germany had

tropical possessions, but no lands in which its surplus population could settle and still remain German citizens. The Germans therefore compared their position with that of Britain, and some among them would have liked to possess lands already acquired by Britain. Thus a colonial rivalry existed, which was one of the causes of disagreement between the countries.

The Utilisation of Tropical Lands.—The settlement and utilisation of temperate lands did not satisfy the needs of the industrial countries, and these countries therefore turned their attention to tropical lands in order to obtain food and raw materials which could not be supplied from the cooler parts of the world.

Sugar, rice, sago, and tapioca ; bananas and other fruits ; tea, coffee, and cacao ; these tropical products are being used in increasing amounts. In the future there must be a greater demand for these and other foodstuffs from tropical regions if the population of the temperate lands continues to increase as it now does, for there are few regions remaining in the cooler parts of the world in which agricultural production can be greatly extended. For increased supplies the world must look to the warmer areas where relatively great heat and rain make possible a great growth of food-forming vegetation.

Still more important, in recent years, has been the demand for increased supplies of raw materials for manufacture. Ores of tin and other minerals ; timber and rubber ; cotton, hemp, jute, and other fibres ; oils, dye-stuffs and drugs ; these are the chief of a long list which is still growing by the discovery and utilisation of other commodities useful in the multitudinous processes of modern industries.

Further, many manufacturers look to tropical regions for markets in which to sell their products, and the

manufacturers consequently desire their governments to develop the tropical lands. The purchasing-power of a tropical region is obviously increased enormously if the population grows in numbers and demands clothes, and luxuries of a "civilised" kind, if European or American tools and machinery are required for carrying on the various kinds of work, if roads, railways, and harbours have to be constructed, and if the region can export goods wherewith to pay for those imported.

Therefore, from several points of view, the nations of Europe and America are greatly interested in the utilisation and general development of tropical lands.

This utilisation involves a great deal. The climatic conditions which make possible the growing of the desired commodities oppose difficulties to their acquisition by white men. Even though the natives can be got to carry on the heavier work, the white men must live in the regions, at least for a time, to organise and oversee the labour; consequently the problem of dealing with "tropical diseases" was forced upon the medical men of Europe and America. In some regions, too, the health of the natives has also had to be very seriously considered, if only in order to obtain sufficient native labour to carry on the desired works.

Recently, medical science has learnt how to combat several of the more serious tropical diseases; examples of this have already been given in the cases of malaria and yellow fever. Another disease which has had serious effects over large areas is that due to a parasite known as the hook worm; people suffering from this disease are listless and lack energy, and it is quite possible that much of the "laziness" which is attributed to the inhabitants of hot countries is due to this or similar diseases.

If progress in "tropical medicine" continues, white men will be able to live more easily in tropical regions, but

it does not seem likely that they will be able to do most of the work, except in the cool highland areas. The advance of medical knowledge may be of even greater importance to the native peoples, among whom diseases are very common. If the governments of the countries insist on sanitation, provide medical assistance and hospitals, and induce the people to live in a more hygienic way, there may be great improvements in the health, efficiency, and happiness of the people of tropical regions.

Another problem which has generally to be faced is that of providing adequate means of communication. The native tracks have to be replaced by roads and railways, and it is very difficult to make and maintain these in the densely forested lowlands and the rugged uplands of many tropical areas. Harbours, too, have to be constructed, and lines of steamers arranged to call at the ports. These enterprises must be carried out on a large scale ; a railway must perhaps be a long one to reach a desired region, and it would be useless to construct it unless a harbour were also made. Therefore much capital is needed, and it must be supplied a long time before there is sufficient traffic to repay the cost of construction ; hence the works must be carried out either by large companies or by governments. In either case, the companies or the governments require an assurance that they will reap the benefit of their expenditure, and to obtain this assurance is one reason why the states of Europe and North America have intervened in, or assumed control of, the government of tropical lands.

Similarly, some of the agricultural enterprises are very extensive and costly, and must be undertaken long before a return can be expected. For example, the owners of rubber plantations have had to send to other continents to get plants which they think may succeed in a particular district ; experiments have to be made as to which kinds

are most suitable and where and how they are best grown ; what plant diseases may attack them in the new country and how these diseases may be combated. Then when the trees are planted, years must elapse before there is any yield of rubber, and a still longer period before the yield repays the expense.

The Annexation of Tropical Lands.—For these reasons, there is a tendency for European governments to intervene and to control the government of tropical lands, and there has been a still more powerful factor in bringing about the annexation of some of these regions.

If all nations could trade quite freely with each other and with any part of the world, manufacturers of any one European state could buy their raw materials and sell their products in any part of the tropics. But such "Free Trade," as it is called, is not the common policy of the manufacturing nations ; most of them have a system of "Protection," by which they make it difficult for manufacturers of other countries to sell goods to their people or to obtain raw materials from their territories.*

Therefore if European manufacturers want to make certain of selling their goods to the inhabitants of a tropical region or obtaining raw materials therefrom, they can only do so if their particular state takes possession of the region. It was in order to ensure the commerce being in the hands of their own subjects, that Britain, France, and the other European states annexed practically the whole of Africa. Two important consequences, apart from the commercial effects, followed from this "partition of Africa." One was the clash between the respective European nations ; for example, at one time a rivalry between England and France and

* How this is done will be explained in the book on "The British Empire and its Problems."

later between France and Germany, to obtain power in a particular district, nearly caused war between these countries, and similar rivalries were among the causes of the enmities which found expression in the Great War.

The second consequence was that millions of people of the "backward races" came under the rule of Europeans, and thus arose some of the problems regarding the peoples of these regions.

The Peoples of Tropical Lands.—The good and bad sides of the plantation system have already been pointed out in the section on Africa, and in all the tropical regions there are difficulties in getting the natives to work for the Europeans in such a way that all concerned are benefited. Some of the most serious difficulties lie in compelling the natives to adopt a way of life entirely different from that in which they were brought up; it can only be hoped that each new generation will find it easier to live in the new way.

In many parts, neither steady work, nor provision for the future was required in the past from people who could get a living with very little labour by gathering the fruit of trees and other easily obtained foods; consequently such people find it unnatural to be required to persevere in their efforts. Also the hot, enervating climate of the tropics makes it particularly difficult for hard work to be continuously performed.

Again, the people are quite uneducated in many of the ways of life which Europeans demand of them, and they must acquire new habits totally unknown before. Then, too, bad habits may be acquired from the Europeans, and trouble comes in consequence. Clashes between Europeans and natives seem bound to arise, but goodwill and experience may make relations more satisfactory in the future than they have been in the past.

Education of the natives is necessary if this is to be accomplished, and in most of the states ruled by Europeans there are the beginnings of educational systems.

In several regions there has arisen, particularly since the Great War, a demand that the peoples should be self-governing ; this has been the case in the Philippines and in India, and the problem of the government of India will be discussed in connection with the British Empire. There is no doubt that when the natives of other regions have been longer under European control and have gained ideas from their governors, when they are more educated and more skilled in modern ways, they too will demand self-government, and in time a problem like that which now faces India will be common throughout the tropical lands.

The Problem of China.— In some ways corresponding to the “ partition ” of Africa among the European Powers, there has been a “ penetration ” of Asia. The peoples of Asia were more numerous and had more strongly developed governments of their own, and in several countries they have been able to resist the attempts of Europeans to obtain control of their territories.

At the end of the eighteenth century, when the Emperor of China ruled over a large part of Asia and far more people than existed in all Europe and America, Britain sent an ambassador to China to demand greater facilities for trade ; but the Chinese Emperor thought his country to be greatly superior both in numbers and in civilisation, and he desired no intercourse with the barbarians. His answer said, “ Swaying the wide world, I have but one aim in view, namely, to maintain a perfect governance and to fulfil the duties of the State ; strange and costly objects do not interest me. . . . I have no use for your country’s manufactures. . . . Our Celestial

Empire possesses all things in prolific abundance and lacks no product within its own borders." Yet he consented to allow the limited trade already permitted at Canton to continue, "as the tea, silk, and porcelain which the Celestial Empire produces are absolute necessities to European nations and to yourselves;" and he added, "I do not forget the lonely remoteness of your island, cut off from the world by intervening wastes of sea, nor do I overlook your inexcusable ignorance of the usages of our Celestial Empire," and he ended the reply with the usual words of his imperial messages: "Tremblingly obey and show no negligence!"

The Chinese policy of self-sufficiency was broken in 1840 by the so-called "Opium War." China endeavoured to stop the importation of opium from India on the ground that opium smoking was harmful to the Chinese people, and the Chinese authorities seized opium which had been illegally introduced by British traders. To support the traders the British government made war on China, and the superior weapons and warlike efficiency of western civilisation achieved an easy triumph. A treaty was forced upon China under which a limited traffic in opium was to continue, trade was to be facilitated by the opening of certain ports, called "treaty ports," to foreigners, and the island of Hong Kong was ceded to Britain.

This was the first infringement of the independence of China, and it has since then been followed by several others. France, Russia, and Germany, in addition to Britain, for some reason or on some pretext, obtained concessions or gained territory from the Chinese.

There are now more treaty ports, and in the foreigners' districts of the towns the Chinese government has neither power nor rights. Remote areas previously tributary to China have been seized, as for instance by the British

and French in Indo-China. As though to balance the acquisition of Hong Kong by the British, the French took the neighbouring territory of Kwangchow. In North China Russia obtained a "lease" of Port Arthur and Dalny, and in the Shantung peninsula Germany acquired Kiaochow, and Britain balanced this acquisition by obtaining Wei-hai-wei. Further, as will be explained presently, Japan obtained Formosa and Korea and made other attacks upon the independence of China.

China was also forced by several nations to grant concessions to build railways, and after military expeditions the Chinese government had to give indemnities to the European victors. To guarantee payment of the indemnities and interest on the loans made for railways and other works, China had to allow foreign nations to impose and to supervise the collection of "customs duties," that is, taxes on goods coming into the country.

In these and in other ways China was "penetrated" both politically and economically, and several foreign nations came to an understanding between themselves as to the possession of "spheres of influence" in China, that is, areas in which they had special interests and possessed special rights. The establishment of "spheres of influence" seemed to come rather near to actual partition and annexation.

Meanwhile, the Chinese people had deposed their alien Manchu Emperor (in 1911) but they were unable to set up a strong government, partly because of the lack among the Chinese people of a spirit of patriotism and of loyalty to the state as a whole. There were struggles for political power, and although one central government after another was set up at Peking, there were at times other governments elsewhere, notably in Canton, for South China was often opposed to North China. As a matter of fact, most of the actual power is still wielded by

the military governors of the various provinces. These governors are in some cases little better than robber chiefs, who pay soldiers to support them and to extort taxes from the people. To obtain money the military governors put on the peasants a new tax, based upon a certain amount of opium which they required each peasant to grow and to sell ; thus they re-established a great evil which had been almost abolished.

As a result of attacks from without and weakness within, China seemed on the point either of being divided up among the greater Powers or of coming under the rule of Japan, when in 1922 a conference of nine states, viz. the United States of America, Belgium, the British Empire, China, France, Italy, Japan, the Netherlands, and Portugal, met at Washington. They agreed upon a treaty which may be summarised as saying : " Hands off China ! "

The chief article in this treaty reads as follows :—

The Contracting Powers, other than China, agree :
(1) To respect the sovereignty, the independence, and the territorial and administrative integrity of China ;
(2) To provide the fullest and most unembarrassed opportunity to China to develop and maintain for herself an effective and stable government ; (3) To use their influence for the purpose of effectually establishing the principle of equal opportunity for the commerce and industry of all nations throughout the territory of China ;
(4) To refrain from taking advantage of conditions in China in order to seek special rights or privileges which would abridge the rights of subjects or citizens of friendly States, and from countenancing action inimical to the security of such States.

In this treaty and others passed at the Washington Conference further agreements were made to ensure

better working of the customs arrangements and better administration of justice, and in particular Japan agreed to restore to China Kiaochow, which she had taken from Germany during the Great War, and Britain agreed to give up Wei-hai-wei.

If the central Chinese government can maintain order within the country and the foreign states keep their promises, there is now hope that China may have a peaceful development.

Yet difficult problems connected with China will still remain. The Chinese settlers in other countries of the Pacific regions have aroused the jealousy and fear of the inhabitants, because they have often succeeded in obtaining work, acquiring wealth, and buying land. This they have done by their hard work and frugality, but their neighbours think of it as done at their own expense ; therefore in several countries there is a desire to prohibit or limit Chinese, and similarly Japanese, immigration. The Chinese and Japanese resent such action, and hence has arisen a problem which will be discussed later in the section on Japan.

Also, the industrial nations of Europe foresee that in the future China will be a very serious competitor in manufacturing. The enormous stores of coal and iron developed by such intelligent and industrious people as the Chinese will enable this country to manufacture for its own needs, and thereby the present exports from America and Europe will no longer be required. Further, China will compete in manufacturing for markets in other countries, and thus a double difficulty will face the older industrial regions.

This economic development of China is not, however, a purely Chinese matter, for it is being carried out by European, American, and Japanese financiers and manufacturers, who use the Chinese natural resources and

employ Chinese workers. Thus the relations between China and other countries are becoming very complicated, and further international agreements will be found necessary.

The Problem of Japan.—In the seventeenth century, Spanish, Portuguese, and Dutch traders reached Japan; but the Japanese saw that trade was followed by annexation in the East Indies and in America, and determined to escape that fate. Consequently foreigners were rigidly excluded: "So long as the sun warms the earth, let no Christian be so bold as to come to Japan." For two centuries this policy persisted, until in 1853 a United States fleet forced the Japanese to realise that it was no longer possible, and that they must come into communication with the rest of the world.

But the Japanese had no intention of submitting to European penetration or annexation; they learnt from the Europeans who came to Japan, and they sent some of their own people to study Western methods in Europe. As a result, they transformed their own government; the Mikado, who hitherto had been little more than a figure-head, was made the centre of a strong government. Further, the Shinto religion, which had been almost displaced by Buddhism, was adopted as the national religion, and in it the Mikado is represented as a god upon earth.

Associated with the Mikado in the government, are a group of statesmen who appear to be dominated by the one ideal of the independence and power of Japan, the ordinary people having little voice in the settlement of affairs.

Consequently, the Japanese army and navy were re-modelled on Western lines, and animated by a great devotion to the Mikado and their country, they became very efficient.

Similarly, the economic development of Japan was systematically pursued, for the government realised that the country was overcrowded and greater production was necessary. Therefore the authorities aided the improvement of agriculture by encouraging the study of new methods and by setting up experimental and model farms; they went further, and insisted on the farmers growing such crops as were considered desirable and following those methods that were ascertained to be the most successful.

Even greater changes were made by the establishment of manufactures, for it was seen that only an industrial development could give the necessary basis of an increase of population, and it was also seen that great iron and steel works were essential to supply material for a powerful army and navy. The government itself started many great industrial undertakings, taxing the people to the utmost in order to obtain the necessary capital. Some of the enterprises are still in the hands of the government, for example, the railways. Others, such as iron foundries and steel works, the great dockyards and shipbuilding yards, and textile mills, are supported by grants from the government and the broad lines of their development and activities are determined by the state. Even when the work is carried on by private companies, the government may be behind them, to aid and control when it is thought desirable.

The foreign trade is likewise carried on as part of a national policy, and in consequence when in the lands around the Pacific Ocean (where the Japanese commerce is largely carried on) Japanese traders or companies want concessions, such as rights to use a harbour, the people of the district often fear it may be an attempt on the part of the Japanese government to get a footing in the region and at last to obtain control over it.

Certainly, Japan has obtained control over large regions on the eastern side of Asia since the latter part of the nineteenth century. Korea and Formosa form two examples of this expansion of Japan.

For a long time China had possessed a vague suzerainty over Korea, but it had little power and the government of Korea was both weak and also very bad. Japan saw Russian dominion advancing across Asia and reaching close to its own territory in the Amur region and at Vladivostok, and the Japanese government feared that Korea might be acquired by Russia and preferred to have in its own power this "bridge" between Japan and the mainland.

Therefore when China attempted to enforce its suzerainty over Korea and to intervene in the government, Japan and China went to war and the latter country was hopelessly beaten. China had to declare the independence of Korea and to give up Formosa to Japan.

This occurred in 1895, and a few years later Russia obtained Dalny and Port Arthur in the Liaotung Peninsula, and extended the Siberian railway to these ports. Japan greatly disliked the advance, and when Russia obtained from Korea a right to cut timber within the northern boundary of Korea and asked for a port in that district, Japan openly objected.

Then, in 1904, broke out the Russo-Japanese war, in which again Japan was successful, and by the consequent treaty obtained from Russia possession of the southern part of the island of Saghalin, the lease of the ports of Dalny and Port Arthur, and the ownership of the railways in Southern Manchuria. At the same time, Japan made a treaty with Korea, establishing a "protectorate" over that country, and five years later, because of insurrections in Korea, the protectorate was changed to complete annexation.

When the Great War broke out in 1914, Japan took the port of Kiaochow from the Germans and claimed to succeed to German rights in the railway which ran inland through the Shantung peninsula. Also Japan made demands upon the Chinese government for other railway concessions and for the right to obtain coal and to control large ironworks in the Yangtse valley near Hankow. Japan forced the weak Chinese government to agree to these demands, for it realised its need of greater coal and iron supplies than its own territory can furnish.

China seemed likely to pass under Japanese control, but the United States strongly disliked this prospect, and after the war the President of the United States called together the Washington Conference. As has already been stated, China's independence was then guaranteed, and Japan agreed to withdraw its troops from the railway and ports of the Shantung region. Meanwhile, Japan had undertaken developments in Manchuria because of her ownership of the Southern Manchurian railways, and the many Japanese soldiers and settlers in that region make Japan its real master, although the nominal ruler is one of the Chinese provincial governors.

Also, during the Great War, Japanese troops occupied parts of Eastern Siberia and the northern part of Saghalin, and they have not yet been withdrawn from the latter region.

Such a rapid expansion of Japan has caused other nations in the Pacific lands to fear further advance, and it is one factor in deciding the Australian policy of excluding Asiatics altogether from that continent. There is also in Australia the dislike of the success of the individual Chinese and Japanese settlers and the objection to Australia being occupied by colonies of Asiatics. This

objection is felt quite as strongly on the other side of the Pacific Ocean, in Canada and the United States.

On the other hand, the Japanese strongly object to the restrictions placed upon their settlement in Australia and North America, where they see empty or partly empty lands closed to emigrants from their own overcrowded country. They regard themselves as the equals in every way of the Australians, Canadians, and Americans ; they bitterly resent any treatment which is based on a racial difference, and they demand equality with the white peoples in all regions.

This opposition of ideals and interests has been accompanied by a growth of the navies of Japan, America, and the British Empire. The fleets of these three Powers are the greatest in the world, and the competition between them was causing further increases of naval power and seemed very likely to lead to war. Hence the Washington Conference considered this matter, and came to an agreement by which a halt was called to further naval developments, and a fixed proportion established among the navies of the chief Powers.

International Co-operation.—It is clear that no nation lives to itself alone, for its interests are intermingled with those of other nations. Trade rivalries, questions of boundaries, problems of immigration again and again call for settlement. The settlements may be based on reason or they may be based on force ; one or the other method is inevitable. In other words, the countries of the world must be repeatedly faced with the alternative of peaceful settlement or war, and experience has shown that war is not a final settlement, for wars breed enmities which issue in further wars.

Co-operation, therefore, and not conflict, is the only real solution of the problems.

The study of geography shows that "the world is one," and the welfare of mankind demands a similar unity in the co-operation of peoples.

QUESTIONS

AFRICA

1. In what ways are the Atlas Lands of Africa (*a*) like, and (*b*) unlike, the Iberian Peninsula?

2. Write an account of the peoples of North-western Africa and their various occupations.

3. Describe briefly the different types of country included in the Sahara Region. Where possible, explain the causes of the differences.

4. Contrast the natural vegetation of the Mediterranean Region with that found in the Sahara Region, and in each case show how the characteristics of the plant-life are connected with the climate.

5. Give an account of the climate of the Sudan Region, as far as possible showing the reasons for the facts.

6. What do you know of the people and the productions of the Sudan Region?

7. Write a description of an equatorial forest and the various forms of life therein.

8. Show how the natural conditions have partially protected the inhabitants of the Guinea Coast Lands, and how, nevertheless, these inhabitants have been affected by other peoples.

9. Write an account of the Belgian Congo under the following heads: Position and extent; climate; vegetation and productions; people; communications and trade.

10. In what ways are the Angolan and Rhodesian Savannas (*a*) like, and (*b*) unlike, the Sudanese Savannas? Give reasons for the similarities and dissimilarities whenever possible.

11. Briefly describe, and point out the contrasts between, the east and west coastal districts of Africa on the Tropic of Capricorn.

12. Show how the European plantation system in tropical Africa differs from the native methods of agriculture, noting the various changes brought about in the country by the introduction of the plantation system.

13. What do you know of Madagascar and its people? Illustrate your answer by a sketch-map showing the position and latitude of the island, its natural regions and the direction of the prevailing winds.

14. Write an account of Abyssinia under the headings: Position; relief and structure; rivers; climate; vegetation; peoples; government.

15. Explain as fully as you can the statement: "Egypt is the gift of the Nile."

16. What different natural regions are included in the basin of the River Nile? Describe briefly each region.

17. What do you know of the people of Egypt? For what reasons has the British government intervened in Egypt? What changes in Egypt are due to British people?

18. Explain as fully as you can why the greater part of Africa was unknown to Europeans until the latter part of the last century.

19. What parts of Africa are (a) most suited, and (b) least suited, to occupation by white men? Give reasons for your answer, and illustrate it by a sketch-map.

20. Divide Africa south of the equator into natural regions and briefly state the main characteristics of each region.

ASIA

21. Show as fully as you can how the Monsoon Lands are isolated from the other parts of the world in which early civilisations developed.

22. Give an account of the summer and winter monsoon winds of Asia, including the causes of the facts as far as you can.

23. What parts of Asia have their rainfall (a) mainly in summer, and (b) mainly in winter? Show how these facts are related to the wind systems.

24. Which regions of Asia have a very great rainfall? What are (a) the causes, and (b) the consequences, of this heavy rainfall?

25. State and account for the situation of the arid regions of Asia.

26. Give what account you can of Arabia and its inhabitants.

27. "Syria consists of four parallel strips." Describe each of these strips in turn, noting particularly how the contrasts between them are due either to position or to relief or to both position and relief combined.

28. What do you know about the Turkish people, the regions in which they live, and the other peoples who live in the same regions ?

29. Compare *and* contrast the annual flooding of the Nile with the annual flooding of the Euphrates and Tigris, in as many ways as you can.

30. Write an account of Mesopotamia under the following headings : Situation and extent ; formation of the ground ; climate ; water supply ; productions ; people ; cities ; trade ; differences between past and present.

31. Describe the different kinds of country comprised in the Iranian plateau and its mountain borders. What differences in the human geography are connected with the differences in the physical geography of this region ?

32. Describe the appearance and the natural vegetation of the steppe-land of Siberia, showing how these change with the climatic conditions during the year.

33. Contrast the Siberian forest with the Congo forest in as many ways as possible, accounting for the differences.

34. What natural regions are included in Siberia ? Indicate the relative position and the chief characteristics of each region.

35. Describe the different ways in which the peoples of Northern Asia get their living, in each case showing how the occupations are connected with the natural conditions of the particular district in which the people live.

36. Write an account of the Tibetan plateau, its climate, animals, and people.

— 37. Name a region in India which is very densely populated and one which is very scantily populated. In each case, state the position of the region, briefly describe its characteristics and explain why it has so many, or so few, inhabitants.

38. Write an account of the East Indian islands, their climate and productions.

39. Describe the islands Java and Borneo and their people, in such a way as to bring out the differences between them.

40. Write an account of the country, climate, productions and people of Siam.

41. In what respects do Southern, Central and Northern China differ from one another?

42. Give a brief description of each of the different kinds of country drained by the Yangtse-kiang.

43. What are the characteristic productions of Central China? How are these related to the natural conditions of the country and the manner of life of the people?

44. "The Hwang-ho is by no means an unmixed blessing to China." Explain fully this statement and draw a sketch-map to illustrate your answer.

45. Draw a sketch-map showing the situation of the following cities and in regard to each city state how the situation has affected its growth or characteristics: Peking; Hong Kong; Shanghai.

46. Describe the various means of communication in China, pointing out how these are aided or hindered by the physical geography of the country.

47. In what ways do the Chinese people (a) resemble, and (b) differ from, the Japanese people.

48. What contrasts exist between Northern and Southern Japan? Account for the differences where possible.

49. "The fact that Japan is more densely populated than the British Isles is remarkable." Explain why this fact is remarkable, and show how the great population of Japan is supported in a relatively small territory.

50. Give an account of Manchuria under the following headings: Position; climate; productions; communications; people.

AUSTRALASIA

51. Briefly describe and state the situation of each of the natural regions comprising Western and Central Australia.

52. Divide Eastern Australia into natural regions, stating what you know of each region.

53. Describe the distribution of population in Australia, and account for the facts. In what regions and under what circumstances would a marked increase of population be possible?

54. In what respects can New Zealand be compared with

the British Isles, and in what respects must the two regions be contrasted ?

55. Write what you know of the Pacific Islands and their peoples.

NORTH AMERICA

56. Explain as fully as you can why Europeans visiting North America find there more resemblances to their own continent than they find elsewhere.

57. Give what account you can of the development of the United States out of the early European settlements in North America.

58. What is the " Negro problem " of the United States ? How did it arise ? In what area is it acute ? How far is it due (a) to past actions of people, and (b) to natural conditions ?

59. What do you know of the government of the United States ? In what ways is it like, and in what ways is it unlike, that of Mexico ?

60. Compare *and* contrast the mountain regions of Eastern Asia with those of Western North America.

61. Describe the effects which the glaciation of North America has had upon present-day conditions.

62. Describe four types of climate experienced in Western North America. In what regions of the Old World (north of the equator) are there similar climates ?

63. Write an account of the occupations of the people of New England, showing how these occupations are related to the physical environment.

64. Draw a sketch-map showing the situation of New York and explain in as much detail as you can how its position has influenced its development.

65. Contrast the Mohawk Valley with the regions surrounding it, and explain the nature and the causes of its importance.

66. Write an account of the Southern Appalachian Region under the headings : Position and extent ; relief and structure ; natural resources ; population ; relation to neighbouring regions and their peoples.

67. What do you know of the cultivation and manufacture of cotton in the United States ?

68. Describe the coastal region of the United States between New York and Florida Strait, pointing out the changes which would be observed in traversing it from north to south.

69. State the chief industries of the people in the Central Plains of North America, showing how they are connected (a) with the natural conditions of the region, (b) with one another.

70. In what part of North America is wheat-growing most important? Describe the situation, general appearance and climate of the area, and state the routes by which the greater part of the wheat is sent away.

71. State briefly the characteristics of that part of North America and the adjoining islands which lie north of Latitude 60° N. (*Note*.—The parallel of 60° N. almost cuts the southern coast of Alaska and the southern tip of Greenland.)

72. Write an account (as comprehensive and as descriptive as possible) of the Rocky Mountains of North America.

73. What do you know of the country and the people of California?

74. Explain, as fully as you can and with the help of sketch-maps, the reasons for the growth of Los Angeles, Chicago, and Pittsburgh.

75. Compare the relative advantages and disadvantages of San Francisco, New Orleans, and Philadelphia as outlets for the productions of the central part of North America.

76. Divide Mexico into natural regions and state briefly the characteristics of each region.

77. Write an account of the West Indies under the following headings: Position and climate; productions; peoples and governments.

78. What do you consider (a) two of the most densely populated, and (b) two of the least populated, parts of the United States? Account briefly for the facts in each case.

79. "The chief manufacturing districts grow up on coal-fields." Consider to what extent this is true in the case of North America.

80. "Longitude 100° W. divides the United States into an eastern part which is low, well watered and densely populated, and a western part which is high, arid and scantily populated." What are the chief exceptions to this general statement (a) in the east, (b) in the west?

81. Explain fully how it is that although the area of Mexico is one-quarter that of the United States, its population is only one-seventh that of the larger country.

SOUTH AMERICA

82. Give a broad account of the relief and river systems of South America.

83. Describe the different kinds of climate that would be met with in a journey along the west coast of South America, stating the limits of each climatic region.

84. Write an account of the natural vegetation of South America east of the Andes, including the position, characteristics and climatic conditions of each type.

85. State the causes which led to the settlement of those parts of South America in which European immigration has been of importance.

86. Into what natural regions may the state of Venezuela be divided? Briefly describe each type of country.

87. Write a descriptive account of *either* Peru *or* Ecuador.

88. What are the chief products of the Pacific coastal region of South America? Account for their distribution as far as you can.

89. Compare and contrast the Northern, Central and Southern Andean regions.

90. Give a description of the Pampas Region of South America and show how people are transforming it.

91. Account for the facts that Brazil and Argentina are the first and second states of South America in respect of the number of inhabitants.

92. Name four different types of country included in Brazil; state and explain (where possible) the contrasts between these types.

93. Name three regions of South America which are practically unpopulated and yet differ markedly from one another. In each case explain why the conditions have prevented human occupation.

94. What districts in South America do you think are likely to become most densely populated when their resources are fully utilised? Give reasons for your suggestions.

CLIMATES AND THEIR CAUSES

95. Explain, with the help of diagrams, why it is believed that the Earth is a sphere.

96. What are parallels of latitude and meridians of longitude? What is the length of a degree of latitude? Why do the lengths of degrees of longitude differ?

97. Brisbane in Australia is in Longitude 153° E. If a telegram were despatched from London at 2.30 p.m., and took 1 hour in transmission, at what time would it be received according to local time at Brisbane? Give reasons for your working.

98. "North America has five standard time belts." Explain what this statement means, and why the arrangement has been made.

98. What is the length of daylight on June 22nd at the following places: The Arctic Circle; London; the Equator; the Southern Tropic? Account for the facts with the help of diagrams.

100. "The position of the overhead Sun changes gradually." Explain *how* and *why* this position changes. Use diagrams.

101. Show as fully as you can why at London the weather is much hotter in June than in December, while at the equator there is little difference at these two times of the year.

102. Explain why (a) a continental region is hotter than an oceanic region in summer, (b) a lowland is hotter than a mountain top, (c) the hottest part of the day at London is generally in the early afternoon.

103. What movements of the air follow from the heating of one portion of the Earth's surface more than surrounding areas? Explain why these movements occur.

104. Account for the facts that a region with low pressure at the surface usually has cloudy skies and rain, while a region with high surface pressure has a clear sky. Give examples of these conditions, referring to particular places and times.

105. What belts of pressures and winds are normally experienced over the Pacific Ocean? State the positions of these belts at successive periods of the year, and account for the changes of position.

106. State, and account for, the differences between the climates of the western and eastern coasts of a continent in latitudes 20° to 30° .

107. Explain how the belt systems of pressures and winds are modified over the Eurasian land-mass in summer and in winter respectively.

108. Give an account of the currents of the Atlantic Ocean, and show how these are related to the prevailing winds.

THE NATURAL REGIONS OF THE WORLD

109. What is meant by a "Natural Region"? What conditions are taken into account in settling the limits of such a region? Illustrate by considering any particular region which differs markedly from adjoining regions in several respects.

110. What are the common characteristics of the regions of the Equatorial Forest and Jungle type? State the situation of these regions as accurately as you can.

111. How do the various African regions of the Tropical Savanna type differ from one another? What are the causes of the differences?

112. In what respects are the South-eastern Monsoon Lands (*a*) like, and (*b*) unlike, Northern Australia? Account briefly for the similarities and the differences.

113. State, and account for, the position of the chief arid regions of the world.

✓114. What is meant by the "Mediterranean" type of climate? State and account for the situation of the regions which have this type of climate.

115. In what ways may the eastern part of the United States be (*a*) compared, and (*b*) contrasted, with central and northern China? Briefly explain the reasons for the comparisons and the contrasts.

116. State as precisely as you can the areas in the Southern Hemisphere which may be described as "Eastern Warm Temperate Regions," and state concisely the chief characteristics of each of these areas.

117. What other regions of the world have a climate similar to that of North-western Europe? In what respects, and for what reasons, do these regions differ from North-western Europe?

118. State the position, limits, and climatic conditions of the regions described as "Eastern Cool Temperate." Account as fully as you can for each of the facts you state.

119. Describe concisely the situation, climate and natural vegetation of the temperate steppelands of the world.

WORLD PROBLEMS

120. Explain as fully as you can the statement : " Until the period of the great discoveries Europe received rather than gave."

121. State briefly the chief causes and consequences of the emigration of Europeans to other temperate regions during the last few centuries.

122. Explain why Europeans have exploited and annexed tropical regions during recent years.

123. What have been the results upon tropical peoples of the European utilisation of tropical lands ?

124. Give an account of the relations between China and other states during the last century.

125. What economic developments in China are likely to occur ? Upon what conditions may these developments depend, and what consequences do you think may follow from them ?

126. Write an account of the recent expansion of the Japanese Empire, indicating the causes of the events where you can do so.

127. " No nation lives to itself alone ; international questions repeatedly call for settlement." Give instances to illustrate this statement.

128. How does the study of geography show that " the world is one " ?

129. Give instances in which states have co-operated to solve international problems.

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